

CFTRI-MYSORE



4966

Handbook of diet

8571

Rs 30/-

50359

K. KRISHNAMURTHY
P.O. BOX No 384
MOUNT ROAD.
MADRAS.

- 4966 ① diet therapy
- ② normal diet
 - ③ basic diet
 - ④ diet modifications
 - ⑤ patients
 - ⑥ sodium restricted diet
 - ⑦ meals ⑧ human nutrition

TUMS

**HANDBOOK
OF
DIET
THERAPY**

HANDBOOK
OF
DIET
THERAPY

WRITTEN AND COMPILED BY **DOROTHEA TURNER**

DEPARTMENT OF MEDICINE, UNIVERSITY OF CHICAGO

FOR THE AMERICAN DIETETIC ASSOCIATION

THIRD EDITION, 1959

THE UNIVERSITY OF CHICAGO PRESS



L; 4:642 '8
N59

4966 ✓



THE UNIVERSITY OF CHICAGO COMMITTEE
ON PUBLICATIONS IN BIOLOGY AND MEDICINE

Lester R. Dragstedt • R. Wendell Harrison
Franklin C. McLean • C. Phillip Miller
Thomas Park • William H. Taliaferro

Library of Congress Catalog Card Number: 59-10429

THE UNIVERSITY OF CHICAGO PRESS, CHICAGO & LONDON
The University of Toronto Press, Toronto 5, Canada

© 1946, 1952, and 1959 by The University of Chicago

Third Edition published 1959

Third Impression 1962

Composed and printed by

THE UNIVERSITY OF CHICAGO PRESS
Chicago, Illinois, U.S.A.

CFTRI-MYSORE



4966

Handbook of diet..

FOREWORD

The fact that this is the third edition of the *Handbook of Diet Therapy* speaks well for this little book. The *Handbook of Diet Therapy* is particularly significant because it emphasizes what might be called "optimum normal nutrition." Intelligent diet therapy should be molded around a basic food plan selected to provide the essentials of good nutrition, yet designed with consideration to the disease under treatment and the food habits of the individual patient. Among the new additions, the material on menu patterns and sample meals should be helpful, particularly when long-range changes in patterns of eating are indicated, as is the case in most problems of medical interest.

The field of diet therapy has been flooded with a variety of diets in controversial terminology. The simplification, clarity, and common sense of the material found in this *Handbook* are most valuable. We would all do well to clear our fields of overlapping material, follow the procedures suggested in the *Handbook*, and thereby avoid the confusions that often result in the minds of the hospital staff regarding therapeutic diets. We need to teach plain, accurate, and simple facts about diet therapy in terms of normal nutrition in our medical, nursing, and dietetic schools. This *Handbook* will be helpful in such a program.

The first revision extended the material on low-sodium and diabetic diets; this new edition extends material on low-fat diets and includes useful information on the fatty acid content of foods. There are two main reasons for the increased interest in the quantity and

type of fat in the diet. One results from the "formula feeding" studies, which have uniformly shown that such diets made with a polyunsaturated fat such as corn or cottonseed oil result in a decrease in serum cholesterol. The other comes from epidemiologic studies, which suggest that some populations with lower fat intakes have lower levels of serum cholesterol. Contemporary researches indicate that many other aspects of nutrition may be involved in atherosclerosis, and no doubt, by the time another edition of this book is put out, more factual and useful information will be available.

FREDRICK J. STARE

HARVARD SCHOOL OF PUBLIC HEALTH
HARVARD UNIVERSITY, BOSTON

PREFACE

The purpose of the *Handbook of Diet Therapy* continues to be to provide aid in naming, defining, and describing therapeutic diets in line with dietetic principles. Up-to-date definitions of dietetic terminology have been taken from the *Revised Glossary of Dietetic Terms* (1958), which appears *in toto* in this edition.

Since the aim of the normal dietary regimen is to maintain or bring the patient to a state of nutritive efficiency, it is logical to assume that a therapeutic diet will be planned as nearly as possible to meet or exceed the requisites of the normal diet. With this principle in mind, the therapeutic diet has again been considered as a modification of the normal diet.

Therapeutic variants, however, are largely quantitative in nature. For this reason, the normal diet and all therapeutic diets have been assessed in quantitative terms which will permit simple and relatively accurate modifications, as well as a quick appraisal of the over-all nutritive content.

While a nutrient evaluation of each therapeutic diet has appeared previously, the description of the daily diet has been greatly extended to include a sample menu pattern, a description of food groups used, and sample meals. It is hoped that this addition may be helpful to the dietitian or physician in implementing the teaching of patients and students in nursing, medicine, social service, and dietetics.

Many chapters have been completely rewritten. The chapter on modifications in the fat and fatty acid content of the diet now includes an evaluation of the saturated and unsaturated fatty acids in a basic diet, a sample menu pattern, a description of food groups,

and sample meals. In addition, over 250 food items, together with values for saturated and unsaturated fatty acids, cholesterol, protein, and caloric values have been included, to facilitate modifications in the basic diet to suit various levels of, or ratios between, fats, fatty acids, and related nutrients.

A new chapter on protein modifications includes a discussion of adjustments in the protein level of the diet, protein fractions, and the amino acids, which have become of therapeutic interest. Of current interest is the phenylalanine-restricted diet, which has been illustrated for the possible use of patients with phenylketonuria. A discussion of the gliadin or glutamine-bound fraction of protein in wheat, rye, oats, and barley has been added for use in certain malabsorption syndromes. A table containing values for the eight essential amino acids, plus arginine and histidine in 202 food items, will be of value in appraising the amino acid content of the diet.

Chapters on the sodium-restricted diet, the low- and high-caloric diets, and the soft and low-fiber diets have been completely revised. In these chapters, also, sample menu patterns, descriptions of food groups, and sample meals have been added. It is not intended that any of these sample menu patterns or sample meals be considered rigid. Since dietary care will vary in terms of ethnic and cultural needs, it is hoped that these samples will be considered suggestive only and that adaptations to suit individual needs will be made from the innumerable combinations of foods available in the food groups.

Where it is desirable that a therapeutic modification be maintained over an extended period of time, special consideration should be given to the patient's food habits and his ability to make the necessary changes. The chapter by Margaret Mead on interviewing the patient serves as an introduction to the problem. New references have been added at the end of this chapter which may serve to broaden the understanding of the many psychologic and social factors involving in changing food habits.

The intent of the *Handbook* has been to bring together in one place information and data now widely scattered in many sources. In so doing, it is hoped that the professional worker and student will have a convenient reference and guide for use in dietetic practice.

DOROTHEA TURNER

CONTENTS

SECTION I

NORMAL DIET

1. Nutritional Evaluation of a Basic Dietary Plan	3
2. Correlation of Basic Diet with <i>Recommended Dietary Allowances</i>	12
3. Modification of Basic Diet at Various Phases of Life	20
Diet during Pregnancy and Lactation	20
Diets during Childhood and Adolescence	21
Diet after Sixty-five Years of Age	28

SECTION II

MODIFICATIONS OF THE NORMAL DIET

4. Modifications in Consistency	31
Liquid Diets	31
Soft and Low-Fiber Diets	36
5. Modifications in Calories	45
Calorie-restricted Diets	45
High-caloric Diet	52

6. Modifications in Fat Intake	55
"Average" Fat Consumption in the United States	55
Basic Diet—30 Gm. Fat	56
Food Preparation	56
Fatty Acid Modifications	61
7. Protein Modifications	63
125-Gm. Protein Diet	63
Amino Acids: Phenylalanine Restriction	64
Protein Fractions: Gliadin Restriction	68
8. Modifications in Protein-Fat-Carbohydrate	70
Food Exchange Lists	71
Calculation of the Diabetic Diet	83
Division of Food into Meals	85
Sample Meal Plans	85
Use of the Exchange Lists	86
9. The Sodium-restricted Diet	89
Nutrient Content	90
Food Preparation	90
Supplementary Materials	96
10. The Low-Purine Diet	99
11. Miscellaneous Modifications	103
Ketogenic Diets	103
Acidic and Basic Elements in the Diet	105

SECTION III

INTERVIEWING THE PATIENT

Interviewing the Patient, by <i>Margaret Mead</i>	109
---	-----

APPENDIXES

1. Food Composition Table for Short Method of Dietary Analysis	121
2. Food Values in Common Portions	130
3. Specific Energy Factors for Calculating Caloric Values of Foods	158
4. Dietary Analysis of Some Common Alcoholic Beverages	159

5. Cholesterol, Fat, and Fatty Acid Content of Foods	160
6. Amino Acid Content of Foods	175
7. Sodium and Potassium Content of Foods and Public Water Supplies	193
8. Mineral Elements and Excess of Acidity or Alkalinity	202
9. Weight and Height Tables	205
10. Energy Expenditure	210

GLOSSARY OF DIETETIC TERMS, REVISED, 1958

Glossary of Dietetic Terms, Revised, 1958	213
---	-----

INDEX

Index	231
-------	-----

LIST OF TABLES

NO.	PAGE
1. Foods Available for Consumption per Person per Week, Spring, 1955	6
2. Evaluation of a Basic Normal Diet for an Adult	7
2A. Description of the Daily Food Plan of Normal Diet	8
2B. Menu Pattern and Sample Meals—Normal Diet for an Adult	10
3. Recommended Dietary Allowances, Revised 1958	13
4. Desirable Weight for Height	16
5. Calorie Allowances for Individuals of Various Body Weights and Ages	17
6. Nutritive Content of Diet for Child between Four and Six Years of Age	23
6A. Menu Pattern and Sample Meals for Child between Four and Six Years of Age	24
7. Nutritive Content of Diet for an Adolescent between Twelve and Fifteen Years of Age	25
7A. Menu Pattern and Sample Meals for an Adolescent between Twelve and Fifteen Years of Age	26
8. Menu Pattern and Sample Meals for Individual Sixty-five Years or Over	27
9. Nutritive Content of Full Liquid Diet	32

9A. Description of the Daily Food Plan for the Full Liquid Diet	33
9B. Menu Pattern and Sample Meals for a Full Liquid Diet	34
10. Formula of High Nutritive Content for Use in Tube Feeding	35
11. Nutritive Content of Soft and Low-Fiber Diet	40
11A. Description of the Daily Food Plan for the Soft and Low-Fiber Diet	41
11B. Menu Pattern and Sample Meals for Soft and Low-Fiber Diet	43
12. Description of Food Plan for Calorie-restricted Diets for an Adult	48
12A. Menu Pattern and Sample Meals for a Calorie-restricted Diet for an Adult	50
12B. Menu Pattern and Sample Meals for a Calorie-restricted Diet during Pregnancy or Adolescence	51
13. Total Fat and Selected Fatty Acids in Diets in the United States	57
14. Fat, Fatty Acids, and Cholesterol in Basic Diet Containing 30 Gm. Fat	57
14A. Description of Daily Food Plan: Basic Diet—30 Gm. Fat	58
14B. Menu Pattern and Sample Meals: Basic Diet—30 Gm. Fat	60
15. Typical Fatty Acid Analyses of Some Fats of Animal and Plant Origin	61
16. Nutritional Evaluation of 125-Gm. Protein Diet	65
17. Maintenance Diet for a Phenylketonuric Child, Aged Twelve Months	67
18. Food Values for Calculating Diabetic Diets	71
19. List 1—Milk Exchanges	72
20. Carbohydrate Content of Vegetables per 100-Gm. Serving	75
21. List 2—Vegetable Exchanges	76
22. Data Used To Calculate the Composition of Vegetables, Group B	76
23. Amount of Fruit Supplying 10 Gm. Carbohydrate	78

NO.	PAGE
24. List 3—Fruit Exchanges	79
25. List 4—Bread Exchanges	80
26. List 5—Meat Exchanges	81
27. List 6—Fat Exchanges	82
28. Caloric Levels of Sample Meals for Diabetics	86
29. Sample Meal Plans for Diabetics	86
30. 500-Mg. Sodium Diet for an Adult	91
30A. Daily Food Plan of Diet Containing 500 Mg. Sodium	92
30B. 500-Mg. Sodium Diet—Menu Pattern and Sample Meals for an Adult	94
31. Purine Content of Foods per 100 Gm.	100
32. Evaluation of a Low-Purine Diet	101
33. Evaluation of a Ketogenic Diet	104
34. Comparison of the Long and Short Methods of Dietary Analysis	123
35. Food Composition Table for Short Method of Dietary Analysis (2d Revision)	124
36. Nutritive Values of Foods	131
36a. Yield of Cooked Meat per Pound of Raw Meat	157
37. Specific Energy Factors for Calculating Caloric Values of Foods	158
38. Dietary Analysis of Some Common Alcoholic Beverages	159
39. Cholesterol Content of Food Samples	160
40. Cholesterol Content of Substances Used as Foods	161
41. Fat, Fatty Acid, and Cholesterol Content of Foods	162
42. Fat, Fatty Acid, and Cholesterol Content of Foods: Sup- plementary Table	170
43. Amino Acid Content of Foods, 100 Gm., Edible Portion	176
44. Sodium Content of Foods	193
45. Sodium and Potassium Content of Foods	195
46. Sodium and Potassium Content of Public Water Supplies	200
47. Mineral Elements and Excess of Acidity or Alkalinity per 100 Gm. of Foods, Edible Portion	202
48. Desirable Weights for Men and Women	205
49. Average Weight for Height Tables (Children)	206
50. Daily Energy Expenditure of the Reference Man and Woman	210

SECTION I | **NORMAL DIET**

Since the aim of a dietary regimen is to maintain or bring the patient to a state of nutritive efficiency, it is logical to assume that a therapeutic diet will be planned to meet or exceed the dietary allowances for a normal individual. On the other hand, there are instances in planning a therapeutic diet in which less than the normal requirement may be indicated, as in caloric or sodium restrictions. Other nutrients, in these instances, should remain at or above the levels of the normal diet. With this principle in mind, it follows that the therapeutic diet will be planned as a modification of the normal diet.

In the organization of a plan for practical use, the first step will be to outline and appraise a basic plan of food intake for the normal dietary regimen. Since most modifications for therapeutic purposes will be of a quantitative nature, in terms of calories, protein, or other nutrients, the basic plan of normal diet will be appraised in these terms to make possible quick and easily assessed adjustments.

To achieve this goal as concisely as possible, space will not be given to itemizing and calculating individual items in a diet. Instead, a basic pattern of diet will be outlined simply in terms of commonly used food groups. With this plan, foods may be combined into groups which are comparable enough in nutrient content to permit substitution within a group. This plan has the advantage of permitting variety in choice, minimizing dietary calculations, and insuring a good nutrient content.

Four food groups have been used in amounts required to meet the

protein, mineral, and vitamin recommendations for the healthy individual. These four groups include the milk group, the vegetable and fruit group, the meat group, and the bread-cereal-potato-legume group. A fifth group—fats and sweets—has been considered separately, since this group adds comparatively little in protein, minerals, and vitamins but may instead be a major source of calories.

In the dietary patterns which follow, these groups have been outlined in the amounts necessary to meet the needs of the individual during adult life, pregnancy and lactation, childhood, adolescence, and after age sixty-five. In each case a nutrient evaluation has been made of the basic diet; each food group has been described; and a sample menu pattern and sample meals have been outlined as illustrations of the food plan.

In appraising the nutritive value of any dietary pattern, a question arises concerning the selection of figures on food composition for this purpose. In the past, nutritional accounting has been based on various tables of food composition. Widdowson and McCance (1)* have pointed out that there are two extreme schools of thought concerning food tables: "One tends to regard the figures in them as having the accuracy of atomic weight determinations; the other dismisses them as valueless on the ground that a foodstuff may be so modified by the soil, the season, or its rate of growth that no figure can be a reliable guide to its composition. The truth, of course, lies somewhere between these points of view."

In order to meet the need for representative values suitable for use in dietary calculations, the Food and Nutrition Board, National Research Council, and the Bureau of Human Nutrition and Home Economics, United States Department of Agriculture, in 1945 published *Tables of Food Composition in Terms of Eleven Nutrients* (2).

This publication has now been superseded by *Composition of Foods—Raw, Processed, Prepared* (U.S. Department of Agriculture, "Agriculture Handbooks," No. 8 [June, 1950]). Numerous foods not listed in the 1945 tables, as well as different forms of food—especially frozen and cooked foods—have been included. In this publication,

* Numbers in parentheses refer to works cited in the References at the end of each chapter.

calories have been calculated by a modification of the procedure that has been in use in this country for over fifty years. Instead of applying the general caloric factors 4, 9, 4 to the percentage of protein, fat, and carbohydrate, respectively, as has usually been done heretofore, more specific factors have been developed for individual foods or food groups.

The principle for this revised procedure of estimating caloric values was published in the report of the Committee on Caloric Conversion Factors and Food Composition Tables, convened by the Nutrition Division of the Food and Agriculture Organization (3). Details of applying this procedure in the estimation of caloric values have been reported by Merrill and Watt (4).

While figures taken from these tables serve a valuable function in making precise values available, it would still be a laborious procedure to make detailed computations of the nutritive value of each item in a menu over a prolonged number of days, unless use were made of a shortened method of calculation.

Leichsenring and Wilson (5) have demonstrated that this is possible with the use of representative mean values of foods when weighted in accordance with the findings of food-consumption studies in the United States. Values from this shortened method of dietary calculation (Appendix I, Table 35, p. 124) have been used in the *evaluations of the nutrient content* of the dietary patterns which follow.

In extending representative values to a *daily food plan* which will serve as a gross guide for practical use, as well as in teaching allied groups or dietary personnel, advantage has been taken of the classification of foods in the basic food groups suggested by Hayes, Trulson, and Stare (6). In the *description* of alternates or substitutes within each of these groups, the "exchanges" originally developed for use in diets planned for patients with diabetes have been used (7). For the most part, the carbohydrate, protein, fat, and caloric values assigned in the exchanges approximate closely the values in the short method of dietary calculation of Leichsenring and Wilson (5). The greatest difference has been in the exchange value for meat, for which less fat and calories are indicated. Obviously, this value depends in part on the amount of fat lost in cooking or wasted at the table, as well as the cut of meat used. In studies reported recently

by Leverton and Odell (8) significant losses were found, suggesting that the lower value might be appropriate for cooked meats. In view of these findings, values have now been brought into agreement.

A *menu pattern* and *sample meals* have also been outlined to illustrate the “daily food plan” and some of the choices possible within each of the four food groups. The fifth group—fats and sweets—has been considered separately to facilitate adaptations in calories.

Obviously, there is no “one” normal diet which must be consumed to insure nutritive sufficiency. Many foods may be combined in amounts which will meet individual needs. In selecting a basic plan, then, it would seem most suitable to combine commonly used foods in amounts which are the most generally acceptable.

TABLE 1
FOODS AVAILABLE FOR CONSUMPTION PER
PERSON PER WEEK, SPRING, 1955

Vegetables and fruit.....	9.7 lb.
Dark-green and deep-yellow vegetables...	0.6 lb.
Citrus fruit.....	1.2 lb.
Milk, cream, cheese.....	4.4 qt.
Eggs.....	0.6 doz.
Meat, poultry, fish.....	4.2 lb.
Separated fats and oils.....	0.9 lb.
Sugars.....	1.4 lb.
Flour, cereals, baked goods.....	2.8 lb.

Fortunately, a gross guide is available in the surveys of household food consumption made by the U.S. Department of Agriculture (9). The latest one, made in the spring of 1955, covered a national sample of six thousand families. These surveys provide data on the quantities brought into the kitchen of some two hundred or more food items. The kind and average quantity of foods used have been summarized by Stiebeling (10) in Table 1. The nutrient evaluation by Stiebeling (10) indicates that these foods in these amounts meet or exceed the Recommended Dietary Allowances (11). As such, then, they serve to suggest a framework for the basic plan.

In the basic normal diet, which follows (Table 2), the amounts of the milk group, the meat group, and the vegetable and fruit group closely approximate the “average diet” given in Table 1. Fats and sweets have been considered separately, in order to permit modifica-

TABLE 2

EVALUATION OF A BASIC NORMAL DIET FOR AN ADULT
(80 Gm. Protein; 2,450 Calories)

DAILY FOOD INTAKE	QUANTITY		CAL- ORIES*	FOODSTUFFS			MINERALS		VITAMINS				
	Weight (Gm.)	Approxi- mate Measure		Protein (Gm.)	Fat (Gm.)	Carbo- hydrate (Gm.)	Ca (Gm.)	Fe (Mg.)	A (I.U.)	Ascorbic Acid (Mg.)	Thia- mine (Mg.)	Ribo- flavin (Mg.)	Niacin EQUIVA- LENT (Mg.)
Milk, whole.....	488	1 pt.	330	17	19	24	0.58	0.4	780	5	0.18	0.84	4.6
Egg.....	54	1 medium	75	6	6	Trace	0.03	1.3	550	.....	0.05	0.14	1.8
Meat, poultry, fish, cooked; or cheese†	120	4 oz. E.P.†	300	28	20	.....	0.10§	3.8	6,610	4	0.27	0.74	10.8
Bread, whole-grain or enriched white...	180	6 slices	480	16	6	90	0.16	3.6	.....	.....	0.48	0.26	6.6
Cereal, whole-grain or enriched.....	20	½ cup	80	3	1	15	0.03	0.6	.....	.....	0.08	0.04	0.8
Potato, cooked.....	100	1 small	85	2	.....	19	0.01	0.7	20	14	0.09	0.03	1.3
Vegetable, green or yellow||	100	½ cup	30	2	.....	5	0.09	1.3	6,280	30#	0.08	0.15	1.3
Vegetable, other**	200	1 cup	50	2	.....	10	0.06	1.0	450	30#	0.09	0.10	1.0
Fruit, citrus††	100	1 serving	40	1	.....	10	0.02	0.2	110	45	0.05	0.02	0.2
Fruit, other††	.....	2 servings	80	1	.....	20	0.03	0.9	1,905	35	0.08	0.09	0.9
Subtotal††	.....	.....	1,550	78	52	193	1.11	13.8	16,705	163	1.45	2.41	29.3
Fats and oils§§	.....	.....	.....	.....	.....	.....	.....	.....	660	.....	.....	.....	.....
Sugar and sweets§§	.....	.....	900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	.....	.....	2,450||	.....	.....	.....	1.11	13.8	17,365	163	1.45	2.41	29.3

* Calories have been rounded off to nearest 5.
† Weighted on average food consumption data (except liver). If 2½ oz. liver are not used weekly, the vitamin A value and ascorbic acid must be discounted completely.
‡ Edible portion.
§ If 4 oz. Cheddar-type cheese are not used during a 10-day period, an additional 100 gm. milk daily will supply equivalent calcium.
|| Asparagus, broccoli, carrots, green beans, kale, yellow squash, pumpkin spinach, turnip greens, and other greens.
For canned vegetables, reduce by one-half.
** Tomato—fresh, canned, or juice; vegetables commonly served raw, as celery, cucumber, lettuce, and cabbage; and other cooked vegetables, as beets, eggplant, onions, rutabagas, and cauliflower.
†† Portion sizes have been adjusted to provide equivalent carbohydrate and caloric values, as in Table 24.

†† Minerals, vitamins, and protein will approximate the Recommended Dietary Allowances (see Table 3) for a normal, physically active man weighing 70 kg. or a physically active woman weighing 58 kg. To meet additional caloric needs, further amounts of the above foods may be used, plus other sugars, starches, and fats (Tables 35, 36).
§§ Per capita fats and sweets available amount to approximately 2 oz. separated fats and oils and 3 oz. sugar per day. From *Food Consumption and Dietary Levels of Households in the United States—Some Highlights from the Household Food Consumption Survey, Spring, 1955* (Agricultural Research Service, U.S. Department of Agriculture, ARS 62-2 [Washington: Government Printing Office, 1957], 0-433306).
|| Caloric needs should be adjusted to individual needs. The Recommended Dietary Allowances are leveled at moderate activity. For variations in activity see pp. 194-95.

TABLE 2A

DESCRIPTION OF THE DAILY FOOD PLAN OF NORMAL DIET
(80 Gm. Protein, 1,550-2,450 Calories; Derived from Table 2)

Daily Food Plan	Description
MILK GROUP	
1 pint*	<p><i>One pint whole milk</i> contains 330 calories, 17 gm. protein, calcium, phosphorus, and the B complex in important amounts. One pint buttermilk made from whole milk or $\frac{1}{2}$ pint evaporated milk are similar.</p> <p><i>One pint skim milk</i> contains 165 calories, 17 gm. protein, and important amounts of calcium, phosphorus, and the B complex. If completely skimmed, no fat will be present, accounting for the 50 per cent decrease in calories. One pint of buttermilk made from skim milk or $\frac{1}{2}$-$\frac{2}{3}$ cup (depending on brand) of non-fat milk solids is similar.</p>
MEAT GROUP†	
5 meat equivalents	<p><i>One meat equivalent</i> is approximately equal to 1 oz. (edible portion—weighed after cooking) beef, veal, lamb, pork, poultry, fish, cheese, or 1 egg. The five equivalents may be distributed throughout the day as desired. Liver and other variety meats are exceptional sources of vitamin A, iron, and the B complex. Four ounces of cooked meat may contain about 28 gm. protein and 300 calories.</p>
VEGETABLE AND FRUIT GROUP	
6 servings	<p><i>A dark-green or deep-yellow vegetable</i> is important each day for its vitamin A value. Asparagus, green beans, broccoli, carrots, green pepper, winter squash, pumpkin, and other greens make up this group. Carrots, winter squash, and pumpkin may contain about 35 calories per serving. The others will be negligible.</p> <p><i>Other vegetables</i>, as beets, cabbage, cauliflower, celery, cucumber, eggplant, lettuce, mushrooms, onions, peas, tomatoes, or turnips contribute varied amounts of all nutrients. Beets, onions, peas, or turnips may contribute about 35 calories per $\frac{1}{2}$-cup serving. Others will be negligible.</p> <p><i>Citrus fruit or other fruit rich in vitamin C</i> is important each day. One orange or $\frac{1}{2}$ cup juice, or $\frac{1}{2}$ grapefruit or $\frac{1}{2}$ cup juice, or 1 cup tomato juice or 1 cup strawberries or 1 cup red raspberries or $\frac{1}{4}$ cantaloupe or 1 large tangerine contains about 40 calories per serving and important amounts of vitamin C.</p>

* 1 qt. of milk during last trimester of pregnancy; 1½ qts. of milk during lactation.

† If more meat is desired, 1 additional meat equivalent (edible portion—1 oz. cooked meat) may be substituted for 1 serving of the bread group without a significant change in calories. Other rearrangements or omissions should be assessed by reference to Tables 2 and 3.

TABLE 2A—Continued

Daily Food Plan	Description
VEGETABLE AND FRUIT GROUP—Continued	
6 servings— Continued	<i>Other fruits</i> , such as 1 apple or 1 peach or 1 pear or 2 prunes or 4 halves apricots or 12 grapes or $\frac{1}{2}$ banana, contribute varied amounts of all nutrients and contain about 40 calories per serving. For other fruits see Table 24, p. 79, in text. If sugar or syrup is added, additional calories must be calculated.
BREAD-CEREAL-POTATO-LEGUME GROUP	
8 servings	<i>One serving provides approximately 70 calories</i> , important amounts of the B complex, and iron. One serving is equal to 1 slice enriched or whole-wheat bread, $\frac{1}{2}$ cup white potato, $\frac{1}{4}$ cup sweet potato, $\frac{1}{2}$ cup corn, $\frac{1}{2}$ cup cooked macaroni, noodles, spaghetti, rice, cornmeal, or $\frac{1}{2}$ cup cooked dried beans or peas, $\frac{1}{2}$ cup cooked cereal, or $\frac{3}{4}$ cup flake-type cereal or 2 graham crackers. For other equivalents see Table 25, p. 80.
FATS AND SWEETS	
	<i>Without this group</i> the calories for the day approximate 1,385–1,550 (depending on whether skim milk is used). The 2 oz. separated fats and oils and 3 oz. sugar available per capita in the United States would add approximately 900 calories. Adjustments to fit individual needs may be made as follows:
	<i>If one level teaspoon fat or oil</i> is used on bread, in vegetables, or in cooking, about 45 calories may be added. One thin slice crisp bacon, 2 tablespoons light cream or 1 tablespoon heavy cream, 1 teaspoon mayonnaise or oil, 1 tablespoon cream cheese or French dressing, or 5 small olives or 6 small nuts, also contain 45 calories each.
	<i>One level teaspoon sugar, jelly, or honey</i> in cooking, on cereal, in fruit, or in coffee adds 20 calories. One-half cup ice cream, pudding, or gelatin dessert may add between 150 and 300 calories, and one serving cake or pie between 300 and 700 calories (see Tables 35 and 36 for additional caloric values).
IODIZED SALT	
	Iodized salt should be used in regions where iodine is lacking. Iodized salt is especially important in adolescence and pregnancy.

TABLE 2B

MENU PATTERN AND SAMPLE MEALS—NORMAL DIET FOR AN ADULT
(80 Gm. Protein; 1,550–2,450 Calories; derived from Tables 2 and 2A)

DAILY FOOD PLAN*	SAMPLE MENU PATTERN*	SAMPLE MEALS*
	A.M.	
MILK GROUP 1 pint†	$\frac{1}{2}$ cup citrus fruit or juice 1 egg 1 cup cooked enriched or whole-grain cereal or 1 $\frac{1}{2}$ cups flake-type cereal with milk and sugar§ 1 slice enriched or whole-grain toast with spread§ Coffee or tea, if desired, with sugar§ and milk	Orange juice 1 egg 1 cup farina with milk and sugar§ 1 slice toast with spread§ Coffee or tea if desired
MEAT GROUP 5 meat equivalents‡ One equivalent equals 1 oz. meat (edible portion) weighed after cooking		
	Noon	
VEGETABLE AND FRUIT GROUP 6 servings	2 oz. meat, poultry, fish, cheese, or 2 eggs‡ $\frac{1}{2}$ cup potato or substitute Dark-green or deep-yellow vegetable Other vegetable Fruit	Broiled chicken breast Baked potato Broccoli Tomato and lettuce salad Baked apple 2 small hot rolls 1 glass milk
BREAD-CEREAL-POTATO-LEGUME GROUP 8 servings‡	2 slices enriched or whole-grain bread or alternate* with spread§ 1 glass milk	
FATS AND SWEETS§ (Without this group the calories are approximately 1,550)	P.M.	
	2 oz. meat‡ or substitute, as at noon Vegetable Fruit Milk Enriched or whole-grain bread—2 slices or alternate* with spread§ Dessert§	Vegetable soup Sandwich—cheese and ham Lettuce wedge Sliced fresh peaches with ice cream§ Milk

* See Table 2A for alternates.

† The use of 1 pt. skim milk instead of 1 pt. whole milk will reduce the calories by 165. One quart of milk should be used daily during last trimester of pregnancy and 1 $\frac{1}{2}$ qt. during lactation.

‡ If 1 additional meat equivalent (1 oz. E.P.) is desired, 1 serving of the bread group may be omitted with no important change in the calories. Other rearrangements or omissions should be reassessed by reference to Table 2.

§ Without sweets and fats, the diet contains about 1,550 calories. Per capita separated fats and sugar in United States average 900 calories. One teaspoon sugar, jelly, or honey adds 20 calories; 1 teaspoon fat or oil, 45 calories. A dessert like gelatin, ice cream, or pudding may add 150–300 calories. A dessert like cake or pie may add between 300 and 700 calories (see Tables 35 in Appendix I and 36 in Appendix II for additional caloric values).

tion in calories, fat, and carbohydrate for various therapeutic purposes. A nutrient evaluation of the basic normal diet for the adult appears in Table 2, a daily food plan and description of the food groups in Table 2A, and a menu pattern and sample meals in Table 2B.

In setting up this guide for normal diet, it is intended only that this pattern of eating be regarded as a framework within which basic foods may be selected in the proper amounts and with a wide variety of choice. It is not to be inferred that an individual must use this exact allotment of foods. However, if omissions or changes are made in the food groups, a reassessment of nutrient content should be made.

REFERENCES

1. WIDDOWSON, E. M., and McCANCE, R. A. Food tables, *Lancet*, 1:230-32, 1943.
2. BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS in co-operation with the NATIONAL RESEARCH COUNCIL. Tables of food composition in terms of eleven nutrients. ("U.S. Department of Agriculture, Miscellaneous Publications," No. 572.) 1945.
3. FOOD AND AGRICULTURE ORGANIZATION, NUTRITION DIVISION. Energy-yielding components of food and computation of calorie values. 1947.
4. MERRILL, A. L., and WATT, B. K. Energy value of foods—basis and derivation. ("Agricultural Research Service, U.S. Department of Agriculture, Handbooks," No. 74.) March, 1955.
5. LEICHSENRING, J. M., and WILSON, E. D. Food composition table for short method of dietary analysis (2d rev.), *J. Am. Dietet. A.*, 27:386-89, 1951.
6. HAYES, O., TRULSON, M. F., and STARE, F. J. Suggested revisions of the Basic 7, *J. Am. Dietet. A.*, 31:1103-7, 1955.
7. CASO, E. K. Calculation of diabetic diets, *J. Am. Dietet. A.*, 26:575-83, 1950.
8. LEVERTON, R. M., and ODELL, G. V. The nutritive value of cooked meat. (Miscellaneous Publication MP-49, Oklahoma Agricultural Experiment Station, Oklahoma State University.) 1958.
9. Household Food Consumption Survey, 1955. ("U.S. Department of Agriculture, Agricultural Research Service Reports," Nos. 1-10.) 1957.
10. STIEBELING, H. K. Food and nutrient consumption trends and consumer problems: talk at American Institute of Nutrition, Chicago. (U.S. Department of Agriculture, Agricultural Research Service, Mimeo.) 1957.
11. FOOD AND NUTRITION BOARD, NATIONAL RESEARCH COUNCIL. Recommended dietary allowances, revised, 1958. ("NAS-NRC Publications," No. 589.)

The next step will be to compare the plan of diet with the nutritional needs of the individual. A guide to the nutrient needs of healthy individuals has been published by the Food and Nutrition Board of the National Research Council, covering individuals from infancy to old age. This guide, *Recommended Dietary Allowances*, has a distinct advantage, in that it covers not only the so-called average needs but also those needs which approach the upper level of “normality.” The recently revised recommendations (1958) appear in Table 3. The notes and excerpts accompanying this table have been taken from the National Academy of Science, National Research Council, Publication No. 589 (1958).

RECOMMENDED DIETARY ALLOWANCES

(Revised 1958)

PURPOSES AND INTENDED USES

In 1940 the Food and Nutrition Board accepted an assignment from the National Defense Advisory Commission to recommend a formulation of nutrient allowances for daily consumption which would be adequate for maintenance of good nutrition in essentially all the population of the United States. The title “Recommended Dietary Allowances” was selected for this standard in the effort to make it clear that the levels of nutrient intake recommended were judgments which were not to be considered final and which should be re-evaluated periodically as new information became available. Moreover, the use of this term was meant to avoid misinterpretation of the allowances as representing either minimal or optimal nutrient requirements.

Recommended Dietary Allowances was published in a first edition in 1943 (2), and revisions were provided in 1945 (3), 1948 (4), and 1953 (5). In the present

TABLE 3

FOOD AND NUTRITION BOARD, NATIONAL RESEARCH COUNCIL RECOMMENDED
DAILY DIETARY ALLOWANCES,* REVISED 1958 (1)

Designed for the maintenance of good nutrition of healthy persons in the U.S.A.
(Allowances are intended for persons normally active in a temperate climate.)

AGE AND SEX	WEIGHT	HEIGHT	CALORIES†	PRO-TEIN	CALCIUM	IRON	VITAMIN A	THIAMINE	RIBOFLAVIN	NIACIN EQUIVALENT‡	ASCORBIC ACID	VITAMIN D
ADULTS												
	kg.(lb.)	cm.(in.)		gm.	gm.	mg.	I.U.	mg.	mg.	mg. equivalents	mg.	I.U.
Men												
25 years	70(154)	175(69)	3200	70	0.8	10	5000	1.6	1.8	21	75	
45 years	70(154)	175(69)	3000	70	0.8	10	5000	1.5	1.8	20	75	
65 years	70(154)	175(69)	2550	70	0.8	10	5000	1.3	1.8	18	75	
Women												
25 years	58(128)	163(64)	2300	58	0.8	12	5000	1.2	1.5	17	70	
45 years	58(128)	163(64)	2200	58	0.8	12	5000	1.1	1.5	17	70	
65 years	58(128)	163(64)	1800	58	0.8	12	5000	1.0	1.5	17	70	
Pregnancy (2d half)												
			+ 300	+20	1.5	15	6000	1.3	2.0	+3	100	400
Lactation (850 ml. milk daily)			+1000	+40	2.0	15	8000	1.7	2.5	+2	150	400

* The allowance levels are intended to cover variations among most normal persons as they live in the United States under usual environmental stresses. The recommended allowances can be attained with a variety of common foods, providing other nutrients for which human requirements have been less well defined. See text of Publication No. 589 (1) for more detailed discussion of allowances and of nutrients not tabulated.

† Calorie allowances apply to individuals usually engaged in moderate physical activity. For office workers or others in sedentary occupations, they are excessive. Adjustments must be made for variations in body size, age, physical activity and environmental temperature.

‡ Niacin equivalents include dietary sources of the preformed vitamin and the precursor, tryptophan; 60 mg. tryptophan is counted as being equivalent to 1 mg. niacin.

TABLE 3—Continued

AGE AND SEX	WEIGHT	HEIGHT	CALORIES†	PRO-TEIN	CALCIUM	IRON	VITAMIN A	THIAMINE	RIBOFLAVIN	NIACIN EQUIVALENT‡	ASCORBIC ACID	VITAMIN D
CHILDREN UP TO TWELVE YEARS												
Infants§	kg.(lb.)	cm.(in.)		gm.	gm.	mg.	I.U.	mg.	mg.	mg. equivalents	mg.	I.U.
0 to 1 month												
2 to 6 months	6(13)	60(24)	kg. X 120	See	6.6	5	1500	0.4	0.5	.6	30	400
7 to 12 months	9(20)	70(28)	kg. X 100	Footnote§	0.8	7	1500	0.5	0.8	7	30	400
1 to 3 years	12(27)	87(34)	1300	40	1.0	7	2000	0.7	1.0	8	35	400
4 to 6 years	18(40)	109(43)	1700	50	1.0	8	2500	0.9	1.3	11	50	400
7 to 9 years	27(60)	129(51)	2100	60	1.0	10	3500	1.1	1.5	14	60	400
10 to 12 years	36(79)	144(57)	2500	70	1.2	12	4500	1.3	1.8	17	75	400
CHILDREN THIRTEEN TO NINETEEN YEARS												
Boys												
13 to 15 years	49(108)	163(64)	3100	85	1.4	15	5000	1.6	2.1	21	90	400
16 to 19 years	63(139)	175(69)	3600	100	1.4	15	5000	1.8	2.5	25	100	400
Girls												
13 to 15 years	49(108)	160(63)	2600	80	1.3	15	5000	1.3	2.0	17	80	400
16 to 19 years	54(120)	162(64)	2400	75	1.3	15	5000	1.2	1.9	16	80	400

§ See text of Publication No. 589 (1) for discussion of infant allowances. The Board recognizes that human milk is the natural food for infants and feels that this is the best and desired procedure for meeting nutrient requirements in the first months of life. No allowances are stated for the first month of life. Breast feeding is particularly indicated during the first month when infants show handicaps in homeostasis due to differ-

ent rates of maturation of digestive, excretory, and endocrine functions. Recommendations as listed pertain to nutrient intake as afforded by cow's milk formulas and supplementary foods given the infant when breast feeding is terminated. Allowances are not given for protein during infancy.

revision the previously described purposes and bases of the allowances are reaffirmed.

These allowances are designed to maintain good nutrition in healthy persons in the United States under current conditions of living and to cover nearly all variations of requirements for nutrients in the population at large. They are meant to afford a margin of sufficiency above minimal requirements and are therefore planned to provide a buffer against the added needs of various stresses and to make possible other potential improvements of growth and function. The allowances are not to be considered adequate to meet the additional requirement associated with disease or for nutrient repletion in severely depleted persons. On the other hand, they may be more generous than would be practical for feeding large groups under conditions of limited food supply or economic stringency. The margin of sufficiency above minimal requirements varies widely among the single nutrients listed. This occurs because of relative differences in storage capacity in the body, in the range of requirement among individuals, in the difficulty of assessing precise requirements, and in possible hazards of excessive intake between the essential nutrients. Information available is not adequate to permit designation of these as optimal levels of intake.

Patterns of food consumption in the United States permit ready adaptation and compliance with the recommendations (8). They have been widely used for planning diets and food supplies for groups. It should be realized, however, that, in using this standard for evaluation of diets, it cannot be assumed that food practices are necessarily poor or malnutrition exists because these higher goals of nutrient intake are not completely met. As applied to individuals, the allowances can serve as a point of reference, and deviations should be interpreted only in terms of the total observation of the individual's nutritional status.

The different objectives of national food standards should be noted. For instance, the Canadian standard seeks to establish "a nutritional floor beneath which maintenance of health of the people cannot be assumed" and of necessity, therefore, approaches minimal nutrient requirements (6). The British standard aims at maintenance of good nutrition in the average person (6), while the United States allowances are intended to provide for maintenance of good nutrition in not only the average person but in substantially all normal persons.

This revision of *Recommended Dietary Allowances* includes changes in the "reference" individuals and in the manner of expression of allowances for niacin. Other less important adaptations have been made as well.

SCIENTIFIC BASES FOR THE RECOMMENDED ALLOWANCES

Calories.—Food energy must be afforded the body to meet the needs of basal metabolism, building and replacement of body tissues, specific dynamic activity of food, excretory losses, and physical activity. Calorie allowances have been established in all previous editions of *Recommended Dietary Allowances* with the objective of provision of energy in amounts sufficient, when consumed over an extended period, to maintain body weight or rates of growth at levels most conducive to well-being and health.

In specifying requirements for calories for individuals, the device of the "reference" man and woman, both aged twenty-five and living in a temperate climate with a mean annual external temperature of 20° C. is used. The weight of the "reference" man is given as 70 kilograms, and the "reference" woman is

described as weighing 58 kilograms. Both the man and the woman are presumed to lead a vigorous, healthy life and to be *moderately active physically*, with occupations which could not be described either as sedentary or as hard physical labor. The man would be likely to be in light industry or employed as delivery man, painter, or outdoor salesman. The woman might be homemaker, saleswoman, or bench worker in a factory. The daily allowance as derived for the "reference" man is 3,200 calories and for the "reference" woman is 2,300 calories. In these recommendations the calorie allowances for adults pertain not to actual body weight of individuals or groups, but to desirable body weight (the average weight of individuals of given sex and height at age 25). Adjustments must be made when individuals differ from the "reference" man or woman. Table 4 may be used as a guide. Heights and weights as recorded in-

TABLE 4*
DESIRABLE WEIGHT FOR HEIGHT

HEIGHT (INCHES)	WEIGHT IN POUNDS	
	Men	Women
58.....	.....	112 ± 11
60.....	125 ± 13	116 ± 12
62.....	130 ± 13	121 ± 12
64.....	135 ± 14	128 ± 13
66.....	142 ± 14	135 ± 14
68.....	150 ± 15	142 ± 14
70.....	158 ± 16	150 ± 15
72.....	167 ± 17	158 ± 16
74.....	187 ± 18	.....

* Modified from Metropolitan Life Insurance Company Statistical Bulletin 23 (1942) and 24 (1943). Age is disregarded because weight gains beyond the ages of twenty-five to thirty years are considered undesirable. To adapt caloric allowances for individuals whose weight and height are different from those of the "reference" man and woman see Table 5.

clude clothing usually worn indoors and shoes with one-inch heels. Table 5 may be used in making adaptations of calorie allowances for various body weights and ages.

Adjustment for climate.—Standard conditions for estimating calorie allowances include mean environmental temperature of 20° C. rather than 10° C. as established by the FAO committee. It seems probable that most persons in the United States live in an environment with a mean temperature of approximately 20° C. Most are protected against the effects of cold by warm clothes, central heating, and heated means of transportation. Many also live and work in air-conditioned atmospheres so that the effects of high temperatures are partially but not so completely ameliorated.

If the external temperature varies widely from the standard, corrections in calorie allowances may be made. For lower temperatures there is need for an increase in allowances. To accomplish this, the allowances should be increased by 5 per cent for the first 10° C. decrease from the standard of 20° C. and by

3 per cent for each additional 10° decrease. Similarly, allowances should be reduced for high environmental temperatures, with a reduction of 5 per cent for each increase of 10° C. above the standard temperature.

These adjustments are devised for application to differences in mean annual temperature, but they may well serve for adjustment to seasonal differences as well. In various parts of the United States the difference in mean winter and summer temperatures may range from 10° to 30° C. This would indicate corrections of from 5 to 15 per cent in the calorie allowances according to conditions. It should be observed that all adjustments for climate presuppose an ordinary amount of actual exposure to the climate. For persons spending most of their time out of doors, these adjustments may be insufficient, particularly during winter in the Northern and Central states. It is obvious that people who spend almost all their time in well-heated buildings during the winter will not need the extra food calories required by individuals less effectively sheltered.

TABLE 5
CALORIE ALLOWANCES FOR INDIVIDUALS OF VARIOUS
BODY WEIGHTS AND AGE
(At Mean Environmental Temperature of 20° C. and
Assuming Moderate Physical Activity)

DESIRABLE WEIGHT		CALORIE ALLOWANCES		
Kilograms	Pounds	25 years	45 years	65 years
Men				
50.....	110	2,500	2,350	1,950
55.....	121	2,700	2,550	2,150
60.....	132	2,850	2,700	2,250
65.....	143	3,000	2,800	2,350
70.....	154	3,200	3,000	2,550
75.....	165	3,400	3,200	2,700
80.....	176	3,550	3,350	2,800
85.....	187	3,700	3,500	2,900
Women				
40.....	88	1,750	1,650	1,400
45.....	99	1,900	1,800	1,500
50.....	110	2,050	1,950	1,600
55.....	121	2,200	2,050	1,750
58.....	128	2,300	2,200	1,800
60.....	132	2,350	2,200	1,850
65.....	143	2,500	2,350	2,000
70.....	154	2,600	2,450	2,050
75.....	165	2,750	2,600	2,150

* For additional information covering energy expenditure as it relates to various degrees of activity see Appendix X, p. 194.

Protein, minerals, and vitamins.—The bases for the selection of values in these categories have been discussed in some detail in the original publication (National Academy of Science, National Research Council, Publication No. 589 [1958]).

Niacin equivalent.—The greatest change over previous publications has been in the use of the term “niacin equivalent” and the selection of a value for each age group. These allowances have been calculated by assuming that 60 mg. tryptophan may be converted to 1 mg. niacin. Horwitt (7) has discussed the development of the niacin-equivalent concept and the practical application of this concept to the calculation of dietaries.

Allowances have been calculated by estimating requirements on the basis of both body weight and caloric intake and increasing the higher allowance by 50 per cent. In view of the many uncertainties, it was felt that such an increase seemed desirable. It should provide for differences in requirement among individuals under varying physiologic or dietary situations.

Allowances for infants are based on the studies of Holt (9) and on estimates of the niacin equivalents furnished by human milk.

Allowances for pregnancy and lactation are increased in accordance with the recommended increase in caloric intake, using 4.4 niacin equivalents for each 1,000 calories added to the diet. This amount was further increased by a factor of 50 per cent for reasons given above.

The tryptophan content of the normal diet for the adult (Table 2) totals over 800 mg. Assuming that 60 mg. tryptophan may be converted to 1 mg. niacin, approximately 14 mg. niacin equivalents may be derived in this way. By adding this to the 15 mg. niacin in the diet, a total of 29 mg. niacin equivalents may be estimated.

Since the dietary patterns outlined in the *Handbook* contain at least this amount and sometimes more where larger quantities of milk and eggs are indicated, it may be expected that the levels indicated in the *Recommended Dietary Allowances* have been met.

REFERENCES

1. FOOD AND NUTRITION BOARD, NATIONAL RESEARCH COUNCIL. Recommended dietary allowances, revised, 1958. (“NAS-NRC Publications,” No. 589.)
2. NATIONAL RESEARCH COUNCIL. Recommended dietary allowances. (“National Research Council Reprint and Circular Series,” No. 115.) 1943.

3. ———. Recommended dietary allowances, revised, 1945. ("National Research Council Reprint and Circular Series," No. 122.)
4. ———. Recommended dietary allowances, revised, 1948. ("National Research Council Reprint and Circular Series," No. 129.)
5. ———. Recommended dietary allowances, revised, 1953. ("National Research Council Reprint and Circular Series," No. 302.)
6. PETT, L. B. Limitations in the use of dietary standards: differences in American, British and Canadian standards, *J. Am. Dietet. A.*, 27:28-31, 1951.
7. HORWITT, M. K. Niacin-tryptophan requirements of man, *J. Am. Dietet. A.*, 34:914-19, 1958.
8. Household Food Consumption Survey, 1955. ("U.S. Department of Agriculture, Agricultural Research Service Reports," Nos. 1-10.) 1957.
9. HOLT, L. E., JR. The adolescence of nutrition, *Arch. Dis. Child.*, 31:427-38, 1956.

Chapter 3	Modification of Basic Diet at Various Phases of Life
-----------	---

DIET DURING PREGNANCY AND LACTATION

There is an increased need above the normal maintenance allowances for protein, minerals, vitamins, and calories for use during pregnancy and lactation (see Table 3, from *Recommended Dietary Allowances, Revised, 1958*).

During pregnancy it has been estimated that an additional 40,000 calories will be needed for the entire period (1). The increased energy cost involved in building new tissue for the fetus and the placenta, as well as the increased work load associated with movement and the increase in basal metabolic rate, must be considered. It has been assumed that the increased need will be small in the first half of pregnancy and might be compensated for by decreased activity. In the latter half of pregnancy, an increase of 300 calories per day may be needed. The suitability of these recommendations depends in large part upon the nutritional status upon entering pregnancy, the age of the woman, and the activity during pregnancy. Under any circumstance, the selection of a dietary program should be made in co-operation with a physician and nutritionist.

The caloric requirements of lactation will depend upon the quantity of milk produced and the energy expended in daily activities. It has been recommended (1) that the diet be supplemented by approximately 130 calories per 100 cc. milk produced. For example, if 850 cc. milk are being produced, an additional 1,000 calories per day will be needed.

Protein increases are also indicated to provide for the growth of

the fetus and adenexa in pregnancy, the greatest demands occurring during the latter half of pregnancy. The recommendation (1) indicates 20 gm. daily in addition to the 1 gm. protein per kilogram of body weight recommended for normal maintenance needs. During lactation, protein is required in amounts necessary to meet the needs of milk production. A supplement of 40 gm. daily has been recommended for the lactating woman (1). A corresponding increase in minerals and vitamins has also been indicated.

These recommendations for supplementation may be met by adding 1 pint of milk and 1 meat equivalent to the normal diet (Table 2) during pregnancy and 1 quart of milk during lactation, thus bringing the milk intake during pregnancy to 1 quart daily and to $1\frac{1}{2}$ quarts during lactation. If the milk is not fortified with 400 I.U. vitamin D per quart, an additional supplement will be prescribed by the physician.

With proper adjustment in the milk and meat intake, a daily food plan may be derived from Table 2A. A menu pattern and sample meals are illustrated in Table 2B. Table 7A is also appropriately used in pregnancy.

DIETS DURING CHILDHOOD AND ADOLESCENCE

Relatively more calories, protein, minerals, and vitamins are recommended per unit of weight during the growth period.

A wide range of normality exists in the developmental pattern. Data on heights and weights of children and youth in the United States have been compiled by Hathaway (2). The compilation includes general tables giving height-weight data from research studies on children and youth from thirty-four states and the District of Columbia; height-weight standards used in appraisal of growth and nutritional status; special tables relating height-weight-age data to some factors affecting growth patterns; and an annotated list of references, which furnishes pertinent details of methodology and supplementary information concerning the studies from which data have been quoted. Mean figures indicating height and weight appear in Table 3 (Recommended Dietary Allowances) (p. 14). Average weight for height tables from birth to school age, prepared by Woodbury, appear in Appendix IX, Table 50, p. 190.

No recommendations have been made in *Recommended Dietary*

Allowances (1) for the first month of life, when breast feeding is indicated and calorie allowances for the mother are applicable. After the first month, allowances have been set according to the general pattern of intake of thriving infants and are 120 calories per kilogram for one to six months, inclusive, and 100 calories per kilogram for seven to twelve months, inclusive. The underweight infant may benefit from a larger allowance. These allowances would be provided by about 1,000 ml. of human milk for the two- to six-month period.

After one year there are also wide individual variations in physical activity in children. Consumption studies of small groups have revealed a range of intake with a standard deviation of 30 per cent of the mean and with extreme variations, particularly with athletic children in whom deviations may be even greater (1). At the other end of the activity scale it has been shown that inactive children may become obese even when the caloric intake is well below the figures given in *Recommended Dietary Allowances*. In dealing with feeding problems of children, account should be taken of activity as well as size and age.

While the relative amounts of each food consumed will vary during the child's developmental period, the actual food selection will be similar to that outlined in the basic dietary patterns. For example, the Recommended Daily Allowances for protein indicate a variation in protein between 40 and 100 gm., depending upon the age and size of the child. In younger children the 34 gm. protein provided in 1 quart of milk will insure a surplus of animal protein. With 1 egg and 1 oz. meat in addition, it will be possible to provide two-thirds of the protein as animal protein in a diet including 65 gm. of protein daily.

A combination of foods used by a child between four and six years of age might approximate that given in Table 6. A "Daily Food Plan" is indicated in terms of the various food groups, and "Menu Pattern" and "Sample Meals" have been illustrated in Table 6A. The nutrient evaluation of this plan, shown in Table 6, meets or exceeds the *Recommended Dietary Allowances, 1958* (Table 3).

It is not intended that all children should conform to this precise pattern of eating. However, if any omissions or gross changes in the plan of eating are made, it would be desirable to reassess the nutrient content of the diet by reference to Table 6.

A "Menu Pattern" and "Sample Meals" for an adolescent be-

TABLE 3. NUTRIENT CONTENT OF DIET FOR CHILD BETWEEN FOUR AND SIX YEARS OF AGE
(72 Gm. Protein; 1,425-1,730 Calories)

DAILY FOOD INTAKE	QUANTITY		CAL- ORIES*	FOODSTUFFS			MINERALS		VITAMINS				
	Weight (Gm.)	Approximate Measure		Pro- tein (Gm.)	Fat (Gm.)	Carbo- hydrate (Gm.)	Ca (Gm.)	Fe (Mg.)	A (I.U.)	Ascorbic Acid (Mg.)	Thia- mine (Mg.)	Ribo- flavin (Mg.)	Niacin EQUIVA- lent (Mg.)
Milk, whole†	976	1 qt.	660	34	38	48	1.16	0.8	1,560	10	0.36	1.68	9.2
Egg.....	54	1 medium	75	6	6	Trace	0.03	1.3	550	.....	0.05	0.14	1.8
Meat, poultry, fish, cooked; or cheese†	60	2 oz. E.P.	150	14	10	.....	0.05§	1.9	3,305	2	0.14	0.37	5.4
Bread, whole-grain or en- riched white.....	90	3 slices	240	8	3	45	0.08	1.8	.....	.....	0.24	0.13	3.3
Cereal, whole-grain or en- riched.....	20	½ cup	80	3	1	15	0.03	0.6	.....	.....	0.08	0.04	0.8
Potato, cooked.....	100	1 small	85	2	.....	19	0.01	0.7	20	14	0.09	0.03	1.3
Vegetable, green or yellow||	100	½ cup	30	2	.....	5	0.09	1.3	6,280	30#	0.08	0.15	1.3
Vegetable, other**	100	½ cup	25	1	.....	5	0.03	0.5	225	15#	0.05	0.05	0.5
Fruit, citrus.....	100	1 serving††	40	1	.....	10	0.02	0.2	110	45	0.05	0.02	0.2
Fruit, other.....	.....	1 serving††	40	1	.....	10	0.02	0.5	950	18	0.04	0.05	0.5
Subtotal††	.....	.....	1,425	72	58	157	1.52	9.6	13,000	134	1.18	2.66	24.3
Separated fats and sweets§§	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vitamin D concentrate|||	.....	.....	305	.....	.....	.....	.....	.....	330	.....	.....	.....	.....
Total.....	.....	.....	1,730	72	.....	.....	1.52	9.6	13,330	134	1.18	2.66	24.3

* Calories have been rounded off to nearest 5.

† Milk equivalents may be noted in Table 26.

‡ Based on average food consumption data (except liver). If 2½ oz. liver are not used during a weekly period, the vitamin A value and ascorbic acid must be discounted completely.

§ The calcium value depends almost entirely upon the average use of 60 gm. Cheddar-type cheese during a 10-day period. An additional 50 gm. milk daily will provide equivalent calcium.

|| Asparagus, broccoli, carrots, green beans, kale, yellow squash, pumpkin, spinach, turnip greens, and other greens.

For canned vegetables, reduce by one-half.

** Tomato—fresh, canned, or juice; vegetables commonly served raw, as celery,

cucumber, lettuce, and cabbage; and other cooked vegetables, as beets, eggplant, onions, rutabagas, and cauliflower.

†† Portion sizes of all fruits have been adjusted to provide equivalent carbohydrate and calorie values, as in Table 24.

‡‡ The mineral, vitamin, and protein content of this diet meets or exceeds the Recommended Dietary Allowances (Table 3) for the normal child of this age. To meet additional caloric needs, further amounts of the above foods may be used and/or other sugars, starches, and fats (see Tables 35 and 36).

§§ 5 teaspoons fat or oil would supply approximately 225 calories. 4 teaspoons sugar, jelly, or honey would add approximately 80 calories to the basic diet.

|| 400-800 I.U. vitamin D may be obtained from fortified milk or a concentrate.

TABLE 6A
MENU PATTERN AND SAMPLE MEALS FOR CHILD BETWEEN
FOUR AND SIX YEARS OF AGE
(70 Gm. Protein; 1,730 Calories; Derived from Table 6)

DAILY FOOD PLAN*	SAMPLE MENU PATTERN*	SAMPLE MEALS*
MILK GROUP 1 qt. milk MEAT GROUP 3 equivalents† <i>(One equivalent is equal to 1 oz. cooked beef, veal, pork, lamb, liver, poultry, fish, cheese or one egg)</i> VEGETABLE AND FRUIT GROUP 4 servings (see Table 2A) <i>A dark-green or deep-yellow vegetable is important for vitamin A</i> <i>A citrus fruit or other fruit rich in vitamin C is important daily</i> BREAD-CEREAL-POTATO-LEGUME GROUP 5 servings FATS AND SWEETS <i>(Without this group the diet contains 1,425 calories)</i> 5 teaspoons fat or oil add 225 calories 4 teaspoons sugar, jelly, or honey add 80 calories	A.M.	
	1 citrus fruit or $\frac{1}{2}$ cup juice $\frac{1}{2}$ cup cereal with milk and sugar‡ 1 slice toast with spread‡	Orange juice Enriched farina with milk and sugar‡ Toast with spread
	Noon	
	2 oz. meat, poultry, fish, cheese or 2 eggs $\frac{1}{2}$ cup potato or substitute Dark-green or deep-yellow vegetable Dessert‡ 1 slice enriched or whole-grain bread with spread‡ Milk	Broiled ground beef Baked potato Carrot rings Ice cream Bread with spread‡ Milk
	P.M.	
	1 egg or 1 oz. cheese, meat, poultry, or fish Vegetables, raw or cooked Fruit 1 slice enriched or whole-grain bread with spread‡	Liver in tomato sauce Shredded lettuce Baked apple Bread with spread‡ Milk
	Between	
	Milk	Milk

* For alternates within each food group see Table 2A.

† If additional meat is desired, one serving of bread group (as 1 slice bread) may be omitted for each 1 oz. meat added, without changing the caloric value or reducing nutrient content. Other rearrangements or omissions should be assessed by reference to the values in Table 6.

‡ 1 teaspoon sugar adds 20 calories; 1 teaspoon fat or oil adds 45 calories. Such desserts as ice cream, pudding, and gelatin may add 150-300 calories. For additional caloric values see Tables 35 and 36.

DAILY FOOD INTAKE	QUANTITY		CAL-ORIES*	FOODSTUFFS			MINERALS		VITAMINS				
	Weight (Gm.)	Approximate Measure		Protein (Gm.)	Fat (Gm.)	Carbohy- drate (Gm.)	Ca (Gm.)	Fe (Mg.)	A (I.U.)	Ascorbic Acid (Mg.)	Thia- mine (Mg.)	Ribo- flavin (Mg.)	Niacin Equiva- lent (Mg.)
Milk, whole†	976	1 qt.	660	34	38	48	1.16	0.8	1,560	10	0.36	1.68	9.2
Eggs.....	108	2 medium	150	12	12	Trace	0.06	2.6	1,100	.....	0.10	0.28	3.6
Meat, poultry, fish, cooked; or cheese†	120	4 oz. E.P.	300	28	20	.....	0.10§	3.8	6,610	4	0.27	0.74	10.8
Bread, whole-grain or enriched white.....	150	5 slices	400	14	5	75	0.13	3.0	.....	.....	0.40	0.21	5.5
Cereal, whole-grain or enriched..	20	½ cup	80	3	1	15	0.03	0.6	.....	.....	0.08	0.04	0.8
Potato, cooked.....	100	1 small	85	2	.....	19	0.01	0.7	20	14	0.09	0.03	1.3
Vegetable, green or yellow||	100	½ cup	30	2	.....	5	0.09	1.3	6,280	30#	0.08	0.15	1.3
Vegetable, other**	200	1 cup	50	2	.....	10	0.06	1.0	450	30#	0.09	0.10	1.0
Fruit, citrus.....	100	1 servings††	40	1	.....	10	0.02	0.2	110	45	0.05	0.02	0.2
Fruit, other.....	.....	2 servings††	80	1	.....	20	0.03	0.9	1,905	35	0.08	0.09	1.0
Subtotal††	.....	.....	1,875	99	76	202	1.69	14.9	18,035	168	1.60	3.34	34.7
Vitamin D concentrate§§.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Separated fats and sweets || ||	.....	.....	650	.....	.....	.....	.....	.....	890	.....	.....	.....	.....
Total.....	.....	.....	2,525	.....	.....	.....	1.69	14.9	18,925	168	1.60	3.34	34.7

* Calories have been rounded off to nearest 5.

† Milk equivalents may be noted in Table 26.

‡ Based on average food consumption data (except liver). If 2½ oz. of liver are not used during a weekly period, the vitamin A value and ascorbic acid must be discounted entirely.

§ The calcium value depends almost entirely upon the average use of 120 gm. Cheddar-type cheese during a 10-day period. An additional 100 gm. milk daily will provide equivalent calcium.

|| Asparagus, broccoli, carrots, green beans, kale, yellow squash, pumpkin, spinach, turnip greens, and other greens.

For canned vegetables, reduce by one-half.

** Tomato—fresh, canned, or juice; vegetables commonly served raw, as celery, cucumber, lettuce, and cabbage; and other cooked vegetables, as beets, eggplant, onions, rutabagas, and cauliflower.

†† Portion sizes have been adjusted to provide equivalent carbohydrate and caloric values, as in Table 24.

‡‡ The mineral, vitamin, and protein content of this diet meets or exceeds the *Recommended Dietary Allowances Revised, 1958* (Table 3) for a normal adolescent. To meet additional caloric needs, further amounts of the above foods may be used and/or other sugars, starches, and fats (see Tables 35 and 36).

§§ 400-800 I.U. vitamin D may be obtained from fortified milk or a concentrate.

|| 10 teaspoons fat or oil in cooking, on potato or vegetables, or on bread contain approximately 450 calories. 10 teaspoons sugar in cooking, in cereal, in dessert, or on fruit will contain approximately 200 calories. Adjustments in this group should be made to suit individual caloric needs.

TABLE 7A*
MENU PATTERN AND SAMPLE MEALS FOR AN ADOLESCENT
BETWEEN TWELVE AND FIFTEEN YEARS OF AGE
(100 Gm. Protein and 1,875-2,525 Calories;† Derived from Table 7)

DAILY FOOD PLAN‡	SAMPLE MENU PATTERN‡	SAMPLE MEALS‡
<p>MILK GROUP 1 qt. milk</p> <p>MEAT GROUP 6 equivalents§ (One equivalent equals 1 oz. cooked beef, veal, lamb, poultry, fish, cheese or 1 egg)</p> <p>VEGETABLE AND FRUIT GROUP 6 servings A dark-green or deep-yellow vegetable daily for vitamin A value A citrus fruit or other fruit rich in vitamin C daily</p> <p>BREAD-CEREAL-POTATO-LEGUME GROUP 7 servings</p> <p>FATS AND SWEETS (Without this group the diet contains 1,875 calories) 10 teaspoons fat or oil contain 450 calories 10 teaspoons sugar, jelly, or honey contain 200 calories</p>	A.M.	
	1 citrus fruit or ½ cup juice ½ cup cooked cereal or ¾ cup flake-type with milk and sugar† 1 slice enriched or whole-grain toast with spread† Milk	½ grapefruit ¾ cup flakes with milk and sugar† 1 slice toast with spread† Milk
	Noon	
	2 oz. meat, poultry, fish, cheese or 2 eggs Vegetable 2 slices enriched or whole-grain bread or substitute Fruit 1 glass milk	Sandwich: 2 slices meat 2 slices bread Sliced tomatoes 1 apple 1 glass milk
	P.M.	
	4 oz. meat, poultry, fish, or substitute ½ cup potato or substitute Dark-green or deep-yellow vegetable Other vegetable Fruit 2 slices enriched or whole-grain bread with spread† or substitute Milk	Meat loaf Baked potato Asparagus tips Cabbage slaw Fresh strawberries 2 hot rolls with spread† Milk
	Between	
	Milk	Milk

* Since the Recommended Dietary Allowances (Table 3) during pregnancy may be met by this pattern, this daily food plan may be used for this purpose.

† 1 teaspoon sugar adds 20 calories; 1 teaspoon fat or oil adds 45 calories. Desserts like ice cream, pudding, and gelatin may add 150-300 calories. For additional caloric values see Tables 35 and 36. Adjustments in this group should be made to suit caloric needs of the individual patient.

‡ For alternates within each food group see Table 2A.

§ If additional meat is desired, one serving of the bread group (as 1 slice bread) may be omitted for each 1 oz. meat added, without changing the caloric value or reducing nutrient content. Other rearrangements or omissions should be assessed by reference to the values in Table 7.

TABLE 8
MENU PATTERN AND SAMPLE MEALS FOR INDIVIDUAL
SIXTY-FIVE YEARS OR OVER
(80 Gm. Protein; 1,550-1,750 Calories; Derived from Table 2)

DAILY FOOD PLAN	SAMPLE MENU PATTERN	SAMPLE MEALS
<p>MILK GROUP 1 pint milk</p> <p>MEAT GROUP 5 equivalents (One equivalent equals 1 oz. edible portion of cooked beef, veal, lamb, poultry, fish, cheese or 1 egg)</p> <p>VEGETABLE AND FRUIT GROUP 6 servings A dark-green or deep-yellow vegetable is important for vitamin A value A citrus fruit or other fruit rich in vitamin C is important daily</p> <p>BREAD-CEREAL-POTATO-LEGUME GROUP 8 servings</p> <p>FATS AND SWEETS (Without this group the diet contains 1,550 calories) 3 teaspoons fat or oil add 135 calories 3 teaspoons sugar, jelly, or honey add 60 calories</p>	A.M.	
	1 citrus fruit or $\frac{1}{2}$ cup juice $\frac{1}{2}$ cup cooked cereal or $\frac{3}{4}$ cup flake-type cereal with milk and sugar* 1 slice enriched or whole-grain toast with spread* Coffee or tea if desired*	$\frac{1}{2}$ cup orange juice $\frac{3}{4}$ cup flake-type cereal with milk and sugar* Toast with spread* Coffee or tea if desired*
	Noon	
	Meat, poultry, fish, or cheese (3 oz. edible portion) $\frac{1}{2}$ cup potato or substitute† Dark-green or yellow vegetable Fruit 1 slice enriched or whole-grain bread with spread* Milk	Browned meat pattie Baked potato Broccoli Tossed lettuce and tomato salad* Applesauce Bread with spread* Milk
	P.M.	
	2 oz. edible portion of meat, poultry, fish, cheese or 2 eggs $\frac{1}{2}$ cup potato, or rice, or substitute† Vegetables Fruit 2 slices enriched or whole-grain bread or substitute† Milk	Vegetable soup with crackers† Tuna casserole† Mixed salad greens* Peach custard* 1 slice bread with spread*
	Between	Bedtime
	Milk 2 Graham crackers†	Milk 2 Graham crackers†

* 1 teaspoon sugar adds 20 calories; 1 teaspoon fat or oil adds 45 calories. Desserts like ice cream, pudding, or gelatin may add 150-300 calories. Cake or pie may add 300-700 calories. For additional caloric values see Tables 35 and 36.

† See Table 2A for other alternates within each food group. Five soda crackers (2 inches square) or 2 Graham crackers may be used as an alternate for 1 slice bread.

tween twelve and fifteen years of age are outlined in Table 7A. If any omissions or gross changes are made in this plan, a reassessment may be made by reference to Table 7.

DIETS AFTER SIXTY-FIVE YEARS OF AGE

Caloric requirements decline progressively after the years of early adulthood, because of a decrease in basal metabolic rate as well as lessened physical activity (1).

The *Recommended Dietary Allowances, Revised, 1958* (1), indicate a reduction in calories of 3 per cent per decade between the ages of thirty and fifty and 7.5 per cent per decade from age fifty to seventy. Thus caloric allowances are 21 per cent less at age sixty-five. Values between 1,800 and 2,250 calories are given in the *Recommended Allowances*, depending upon the individual.

Protein, minerals, and vitamins remain at the levels recommended for the young adult. For this purpose, the four food groups outlined in the "Daily Food Plan of Normal Diet for the Adult" (Table 2) will be appropriate. In this way, approximately 1,550 calories will be provided, and protein, minerals, and vitamins will meet or exceed the allowances. A suitable number of additional calories, to fit individual needs, may be obtained to the greatest nutritional advantage by appropriate increases in these four food groups. However, added fats and oils or sugar and sweets may be used if desired. Caloric values may be noted from Tables 2 and 2A and from 35 and 36.

A description of the food groups and the amounts to be used appear in Table 2A. A sample menu pattern and sample meals for the day appear in Table 8. Nutrient evaluation may be made by reference to Table 2.

Special leaflets for use in homes feeding the aged or for use by older individuals may be obtained from The American Dietetic Association, 620 North Michigan Avenue, Chicago, Illinois.

REFERENCES

1. FOOD AND NUTRITION BOARD, NATIONAL RESEARCH COUNCIL. Recommended dietary allowances, revised, 1958. ("NAS-NRC Publications," No. 589.)
2. HATHAWAY, M. L. Heights and weights of children and youth in the United States. ("U.S. Department of Agriculture Home Economics Research Reports," No. 2.) 1957.

SECTION II MODIFICATIONS OF THE NORMAL DIET

As stated previously, the aim of the normal dietary regimen is to maintain, or bring the patient to, a state of nutritive efficiency. If, in illness, deterioration has occurred in the digestive or metabolic processes or in the utilization of nutrients, nutritional needs may increase. On the other hand, there are instances in which a decrease is indicated, as in sodium or calories. In such instances, *all other* nutrients should remain at or above the needs for nutritive efficiency. From this it is logical to assume that a therapeutic diet may be regarded as a modification of the normal diet. With this principle in mind, two basic guides will be called for, from which appropriate adaptations may be made: first, a guide to the recommended nutrient allowances for healthy individuals and, second, a plan of eating which will meet these needs. Appropriate adaptations may then be made from this to suit the special purposes of therapeutic diets.

Recently a revision of a guide to the nutrient needs of healthy individuals has been prepared by the Food and Nutrition Board of the National Research Council, covering individuals from infancy to old age. This guide, called *Recommended Dietary Allowances, Revised, 1958* (11) has been reproduced and discussed on pages 12-19 in the text.

The next step will be to develop a flexible plan of eating which will approximate this level of nutrient content. To achieve this goal as concisely as possible, a basic daily pattern of diet has been outlined simply, in terms of commonly used and available food groups. For

this purpose, foods have been divided into the four food groups which supply the major portion of the day's needs for protein, minerals, and vitamins. These four groups include the milk group, the meat group, the bread-cereal-potato-legume group, and the vegetable and fruit group. A fifth group—fats and sweets—has been noted separately because this group contributes a major source of calories but comparatively small amounts of protein, mineral, and vitamins. In this manner it will be possible to think in terms of a small number of food groups with approximately similar nutrient characteristics rather than many individual food items. This plan has the advantage of requiring a minimum of effort on the part of the dietitian, nurse, or physician in suggesting appropriate variety on a modified diet or in re-totaling the nutrient content of a diet if certain omissions or additions are made to the basic plan for therapeutic purposes.

The selection and definition of the therapeutic diets which follow have been made in terms of dietetic principles rather than in terms of diseases or names of physicians. These definitions are taken from the *Revised Glossary of Dietetic Terms*, prepared by the Committee on Revision of Glossary of Dietetic Terms, Diet Therapy Section, The American Dietetic Association (1950) (see p. 197). In bringing this material up to date, some recent changes in definitions of diets have been incorporated in line with the recommendations of the Committee on Revisions of the Handbook (1957), Lorraine Weng, chairman.

In each therapeutic diet which follows, a definition has been stated; a basic plan of daily food intake has been evaluated for nutrient content; deviations from the Recommended Dietary Allowances for normal diet have been noted; a description of the Daily Food Plan has been presented in terms of food groups; a menu pattern and sample meals have been derived from this, and, where appropriate, foods to restrict have been noted.

It is not intended, however, that these patterns should be used without appropriate adaptations for individual needs. It is hoped only that the description of each diet has been made sufficiently concise and flexible that it will be possible easily to formulate diets suitable for individual needs and with full awareness of the nutritive content.

Chapter 4 *Modifications in Consistency*

LIQUID DIETS

Liquid diets are of two kinds—the full liquid and the clear liquid diet. The *full liquid diet* consists of a variety of foods that are liquid or that liquefy at body temperature. Milk, plain frozen desserts, raw eggs, fruit juice, vegetable juice, cereal gruels, and broth may be used. Finely homogenized meat or liver may be added to the broth or tomato juice to advantage. If this is not done, dried brewer's yeast will serve to improve the iron, protein, and B complex of this diet. Such a diet becomes a modification of a normal diet as far as physical consistency is concerned. The criterion is that it pour.

The foods enumerated in Table 9 will supply 125 gm. protein, 2,150 calories, and minerals and vitamins which approximate or exceed the Recommended Allowances for normal diet. If more or less of any nutrient is desired for a particular purpose, changes may easily be made by reference to the values given in Tables 9 and 9A for each of the food groups. A reassessment may then be made of the total nutrient content.

Description of the daily plan of food intake has been made in Table 9A, followed by a sample menu pattern and sample meals in Table 9B. Innumerable combinations may be made of these foods. The outlines should be considered examples only.

The *clear liquid diet* has been defined in the *Glossary of Dietetic Terms* as one which supplies clear fluids but is of little nutritional benefit. Only fat-free broth, tea, and coffee with sugar but without

TABLE 9

NUTRITIVE CONTENT OF FULL LIQUID DIET*
(125 Gm. Protein; 2,150 Calories†)

DAILY FOOD INTAKE*	QUANTITY		CAL- ORIES†	FOODSTUFFS			MINERALS		VITAMINS				
	Weight (Gm.)	Approximate Measure		Pro- tein (Gm.)	Fat (Gm.)	Carbo- hydrate (Gm.)	Ca (Gm.)	Fe (Mg.)	A (I.U.)	Ascorbic Acid (Mg.)	Thia- mine (Mg.)	Ribo- flavin (Mg.)	Niacin EQUIVA- lent (Mg.)
Milk, whole.....	1,464	1½ qt.	990	51	57	72	1.74	1.2	2,340	15	0.54	2.49	13.8
Milk, non-fat solids...	100	1-1½ cups	330	34	.....	48	1.16	0.8	30	10	0.36	1.68	9.2
Eggs.....	216	4 medium (dry weight)	300	24	24	.....	0.12	5.2	2,200	.....	0.20	0.52	7.2
Cereal, enriched.....	20	2 level tablespoons	80	3	1	15	0.03	0.6	.....	.....	0.08	0.04	0.8
Fruit juice, citrus.....	246	1 cup	100	2	.....	25	0.04	0.4	270	112	0.12	0.04	0.5
Tomato juice.....	121	½ cup	25	1	.....	6	0.01	0.5	1,270	19	0.06	0.04	0.5
Cocoa, dry.....	10	4 level teaspoons	30	1	2	5	0.01	1.2	Trace	.....	0.01	0.04	0.3
Sugar.....	15	1 level tablespoon	60	.....	.....	15	.....	.....	.....	.....	.....	.....	.....
Plain dry gelatin.....	3	1 level teaspoon	10	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bouillon, cube.....	4	1½ in. cube	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.07	1.0
Fats or oils.....	20	4 level teaspoons	180	.....	20	.....	.....	.....	220	.....	.....	.....	.....
Subtotal.....	.....	.....	2,105	119	104	186	3.11	9.9	6,330	156	1.37	4.92	33.3
Dietary supplement, as finely homogenized liver*.....	30	1 oz.	45	7	.....	1	.....	3.2	6,750	11	0.06	0.93	6.2
Total.....	.....	.....	2,150†	126	104	187	3.11	13.1	13,080	167	1.43	5.85	39.5

* With the finely homogenized liver, the mineral, vitamin, and protein levels meet or exceed the Recommended Dietary Allowances (Table 3).

† Calories have been rounded off to nearest 5.

‡ To meet additional caloric needs, further amounts of above foods may be included.

TABLE 9A

DESCRIPTION OF THE DAILY FOOD PLAN FOR THE FULL LIQUID DIET*
(125 Gm. Protein; 2,150 Calories; Derived from Table 9)

Daily Food Plan	Description
MILK GROUP	
1½ qt. fluid whole milk	One and ½ qt. fluid whole milk contain approximately 50 gm. protein and 1,000 calories. Three-fourths quart of evaporated milk or 1½ cups whole milk solids may be used as a substitute.
1-1½ cups (depending on brand) non-fat milk solids	If 1-1½ cups (depending on the brand) non-fat milk solids are added to the 1½ quarts fluid milk, approximately 34 gm. protein and 330 calories will be added to the value of this group. This fluid whole milk containing non-fat milk solids may be used in beverages, strained cereal gruels, strained soups, eggnogs, ice cream, and desserts such as soft custard and rennet desserts.
MEAT AND EGG GROUP	
1 oz. finely homogenized meat and 3 eggs or variations	Three eggs contain 21 gm. protein and 225 calories. One ounce finely homogenized meat will contain approximately 7 gm. protein and 75 calories. Liver is of exceptional value, in iron, vitamin A, and the B complex. However, other finely homogenized meat may be combined with bouillon or broth and served in soup. Meat and eggs may be interchanged.
VEGETABLE AND FRUIT GROUP	
	The purée or juice from spinach, asparagus, carrots, tomato, string beans, or celery may be used. Mild-flavored vegetables are commonly served in soups. However, other vegetable purées or juices may be used if tolerated by the patient. Calories from this source are negligible. Citrus or tomato juice daily provides an important source of vitamin C. One cup citrus juice provides approximately 80 calories; 1 cup tomato juice less than 40 calories.
CEREAL-POTATO GROUP	
1 or more servings	One-half cup strained cooked cereal or ½ cup strained potato contains approximately 70 calories as well as a source of iron and the B complex. Combinations may be made with milk in gruels or soups.
FATS AND SWEETS	
	Three teaspoons sugar contribute approximately 60 calories and serve as flavoring for cocoa, eggnog, or gruel. Four teaspoons fat or oil provide approximately 180 calories and serve as flavoring for gruels or soup.
DIETARY SUPPLEMENT	
	One ounce finely homogenized calf liver supplies 7 gm. protein, 45 calories, and an important source of iron and the B complex. It may be added to bouillon or tomato juice. If this is not used, additional meat and eggs will supply iron, protein, and the B complex.

* If any omissions or changes are made in this food plan, it should be reassessed for nutrient content.

milk or cream are allowed. Occasionally small amounts of ginger ale, clear fruit, or vegetable juice and gelatin may be added. This diet would be used for very brief periods of time when it is necessary to minimize the amount of fecal material in the colon.

Tube feedings may be prepared from a mixture of foods modified in consistency to the point at which the mixture may be passed through a tube. Such feedings may vary from a finely homogenized mixture of the foods served on the "regular or house diet" to food combinations designed to serve particular therapeutic purposes (15, 16). An example of a highly nutritious, high-caloric combination of foods which may be used in a tube feeding is outlined in Table 10.

TABLE 9B

MENU PATTERN AND SAMPLE MEALS FOR A FULL LIQUID DIET*
(125 Gm. Protein;† 2,150 Calories;‡ Derived from Tables 9 and 9A)

SAMPLE MENU PATTERN†	SAMPLE MEALS†
A.M.	
1 cup citrus juice with 1 egg	Citrus juice with whipped egg
Cereal gruel (made from 2 tablespoons dry cereal) and milk containing non-fat milk solids with sugar, butter, or margarine	Cream of wheat gruel
Coffee or tea if desired	Sugar and butter or margarine
	Coffee with milk and sugar
Noon	
Broth with finely homogenized liver or other meat‡	Broth with finely homogenized liver‡
Eggnog, ice cream, rennet dessert, gelatin dessert, or soft custard	Eggnog
Milk containing non-fat milk solids	Rennet dessert
P.M.	
Strained milk soup or cereal gruel‡	Strained potato soup‡
Eggnog, ice cream, or dessert as at noon	Ice cream
	Cocoa
Between	
Mid-morning, mid-afternoon, and bedtime: tomato juice with 3 tablespoons dried brewer's yeast or soup with finely homogenized liver or additional eggs in eggnog and desserts. Milk beverage, ice cream, and soft desserts serve as between-meal nourishments.	

* If any omissions or changes are made in this food plan, it should be reassessed for nutrient content, by reference to Table 9.

† *Foods to restrict:* Obviously, anything that has not been finely homogenized or will not pour has been omitted. While meat, poultry, fish, vegetables, and fruits have been greatly reduced in amount, it would be possible to use more, provided that the food is finely homogenized and diluted to the extent of pouring. Pepper, cloves, mustard, and nutmeg are the spices commonly avoided.

‡ See Table 9A for alternates and for total amounts of foods to be used daily in order to include 125 gm. protein and 2,150 calories.

TABLE 10

FORMULA OF HIGH NUTRITIVE CONTENT FOR USE IN TUBE FEEDING*
(115 Gm. Protein; 3,000 Calories)

DAILY FOOD INTAKE	QUANTITY		CAL- ORIES†	FOODSTUFFS			MINERALS		VITAMINS				
	Weight (Gm.)	Approximate Measure		Pro- tein (Gm.)	Fat (Gm.)	Carbo- hydrate (Gm.)	Ca (Gm.)	Fe (Mg.)	A (I.U.)	Ascorbic Acid (Mg.)	Thia- mine (Mg.)	Ribo- flavin (Mg.)	Niacin EQUIVA- lent (Mg.)
Milk, whole.....	488	1 pt.	330	17	19	24	0.58	0.4	780	5	0.18	0.84	4.6
Cream, 20 per cent....	480	1 pt.	1,000	14	96	19	0.47	0.2	3,960	6	0.14	0.68	4.4
Calf liver, raw, ground	120	4 oz. E.P.	170	23	6	5	0.01	12.7	27,000	43	0.25	3.74	25.0
Eggs.....	216	4 medium	300	24	24	Trace	0.12	5.2	2,200	.....	0.20	0.56	7.0
Brewer's yeast, dried...	13	5 level teaspoons	35	5	.....	5	0.01	2.4	.....	.....	1.27	0.72	6.2
Sucrose, glucose, lac- tose.....	100	½ cup	385	.....	.....	100	.....	.....	.....	.....	.....	.....	.....
Milk powder, whole...	128	1 cup	630	33	34	49	1.22	0.7	1,790	8	0.39	1.87	8.8
Applesauce‡.....	60	4 level tablespoons	45	.....	.....	12	.....	.....	20	1	0.01	0.01	0.2
Orange juice.....	123	½ cup	55	1	.....	14	0.02	.....	230	61	0.10	0.03	0.2
Total§.....	.....	.....	2,950	117	179	228	2.43	21.6	35,980	124	2.54	8.45	56.4

* From F. J. Stare and G. W. Thorn, Protein nutrition in problems of medical interest, J.A.M.A., 127:1120-27, 1945.

† Calories have been rounded off to nearest 5.

‡ Apple powder or pectin may be added to prevent diarrhea.

§ The mineral, vitamin, and protein content of this diet will exceed the Recommended Dietary Allowances (1958) (Table 3) for the normal adult. To meet additional caloric needs, further amounts of the above foods may be used and/or other sugars, starches, and fats (see Tables 35 and 36).

SOFT AND LOW-FIBER DIETS

The soft and low-fiber diets follow the normal diet pattern, with modifications in consistency, i.e., including liquid foods and those solid foods which contain a restricted amount of indigestible carbohydrate and no tough connective tissue.

If the only modification required is that a diet be made mechanically soft, this may be accomplished by cooking, mashing, puréeing, or homogenizing the foods used in a normal diet. If consideration must also be given to the indigestible carbohydrate, connective tissue, or flavor, the following modifications may be made.

Indigestible carbohydrates.—These carbohydrates are substances which make up the cell-wall structure of plants, consisting of varying amounts of cellulose, hemicellulose, lignin, pectic substances, gums, and mucin. A number of foods have been analyzed for their cellulose, hemicellulose, and lignin content by Williams and Olmsted (1), by Olmsted and Williams (2), and by Hummel, Shepherd, and Macy (3). Figures for total fiber determined chemically as crude fiber have been included in the compilation by Chatfield and Adams (4) and in *Composition of Foods—Raw, Processed, Prepared* ("Agriculture Handbooks," No. 8 [U.S. Department of Agriculture, 1950]).

A reduction of the indigestible carbohydrate content of the diet may be effected by the use of refined breads and cereals, immature vegetables, and fruits from which the skins and seeds have been eliminated. During cooking, both the pectic substances and the cellulose are disintegrated (5). For this reason, cooked vegetables and fruits are sometimes used instead of the raw. In extreme instances, still greater reduction in indigestible carbohydrates may be effected by the use of puréed vegetables and fruits or the juice only of the vegetable or fruit.

The trend in recent years, however, has been a more liberal one, due in large part to the observation (6) that vegetable purées are notoriously unpopular and that many patients refuse to eat them. The use of immature vegetables such as frozen or canned young vegetables resulted in a more palatable diet and happier patients, who benefited from eating vegetables which were refused if puréed.

There has also been a trend to the use of a wider variety of fruits

and vegetables, including some raw fruits. Removal of skins and seeds is usually specified, however. Peeled apples, pears, peaches, apricots, and bananas are frequently recommended.

Connective tissue.—Whether meat is tender or less tender is due chiefly to the relative quantity of connective tissue present. Connective tissue in meat consists of white or collagenous fibers and yellow elastic fibers called “elastin.” The total amount of connective tissue depends not only on the extent to which the muscle has been exercised but somewhat on the age. In general, older animals have denser, tougher connective tissue than do younger ones, although the toughness may be lessened in an older animal which has been confined and fattened.

This quantitative difference in the amount of connective tissue present forms the basis for an appropriate cookery process. Tenderness of meat may be increased in cooking with moist heat by the conversion of the collagen in the connective tissue to gelatin and also by the use of low-temperature cookery, in order to reduce or lessen the toughening or hardening of soluble proteins. The total effect of these two reactions depends on the composition of the meat, its acidity, the temperature, and the rate at which it is cooked (7).

Flavor.—Muscle tissue contains such non-protein nitrogenous products as creatine, creatinine, purines, and other products which are thought to stimulate the flow of gastric juices. The most important non-nitrogenous extractive from a quantitative viewpoint is lactic acid (8). In the usual mixed diet, the effect of this factor is minimized, and this consideration becomes of less importance; however, if it is desirable to limit the extractives, poultry as well as meat, meat broths, consommé, and gravy will have to be restricted. In this case adequate compensation for protein and other nutrients provided by meat may be made by the proportional increase in other protein-containing foods.

In recent years the trend in the use of a wide variety of meats has been a liberal one. Beef, veal, pork, lamb, liver, poultry, and fish are all commonly used. Exceptions are generally in terms of the special needs of an individual patient.

Strongly flavored vegetables, such as onions, leeks, radishes, dried beans, and vegetables of the cabbage family—Brussels sprouts,

cauliflower, broccoli, and turnips—have commonly been omitted. Here again it has been found (6) that many patients can and do eat some of the strongly flavored or “gas-forming vegetables” without particular discomfort, if the vegetables are properly prepared. To prevent the decomposition of sinigrin and any other substances yielding disagreeable products that may be present, such vegetables should be heated quickly, to destroy enzymes that catalyze decomposition; the kettle kept uncovered, to prevent the water from becoming acid; the cooking period made as short as possible; and the vegetable drained and served immediately when it is done. Vegetables contain both volatile and non-volatile acids, and these acids are released largely in the first few minutes of cooking. A closed kettle retains not only the volatile sulfur compounds which mar odor and flavor but also volatile vegetable acids, which favor decomposition of the sulfur compounds present (9). *With proper cooking, it may be desirable, therefore, to eliminate only those vegetables which the individual patient cannot tolerate rather than to eliminate all strongly flavored vegetables.*

It is now less common to restrict all spices. Schneider, DeLuca, and Gray (10) have studied the effect of spice ingestion upon the mucosa of fifty patients with active duodenal or gastric ulcer craters. In periods of up to 180 days, it was found that cinnamon, allspice, mace, thyme, sage, paprika, and caraway seed administered with food did not exert a harmful effect upon the stomach as judged by the rate of ulcer healing and clinical symptomatology, the gastroscopic appearance of the stomach before and after the ingestion of spices, and the effect on gastric secretion of pepsin. Black pepper, chili pepper, cloves, mustard seed, and possibly nutmeg were considered gastric irritants.

Beverages.—Coffee contains caffeine, fat, caffeic acid, and chlorogenic acid, which, on oxidation, yields caffeic acid. The chlorogenic acid differs from tannins in that it does not precipitate proteins and is therefore not astringent. The percentage of caffeine varies from $\frac{2}{3}$ to $2\frac{1}{2}$ per cent, with an average of $1\frac{1}{4}$ per cent (11). The main change in roasting consists in the production of aromatic, brown, and oily substances. This oil consists of 50 per cent furfural alcohol, small quantities of valerianic acid, phenol, pyridine, and a nitrog-

enous aromatic substance. A cup of strong coffee contains about 0.1–0.15 gm. of caffeine. A cup of coffee has also been found to contain about 1 mg. of niacin, as well as small amounts of thiamine and riboflavin.

Tea contains caffeine (1.4–3.5 per cent), tannins (1–30 per cent), and traces of theobromine, theophylline, xanthine, and volatile oils. A cup of strong tea prepared from 1 teaspoon of dried leaves contains about 0.1 gm. of caffeine. A quick infusion extracts practically all the caffeine but only part of the tannins. The customary brief infusion is therefore recommended. Tea also contains traces of riboflavin and niacin.

Cocoa contains $1\frac{1}{2}$ – $4\frac{1}{2}$ per cent theobromine, a trace of caffeine, 31 per cent carbohydrate, 9 per cent protein, and approximately 10 per cent fat.

Nutrient content.—In the past it was common practice to put more emphasis on “foods to avoid” and less on “foods to eat,” with the result that this group of diets has been singled out by Duncan (12) and Pollack *et al.* (13) as one of the hazards of hospitalization, resulting in nutritional deficiency and delayed convalescence. Any such deficiency is unnecessary and can be avoided if care is given to the proper selection and amount of food used.

Milk, eggs, meat, poultry or fish, vegetables, and fruit may be used in amounts sufficient to meet or exceed the Recommended Dietary Allowances. This is particularly important for those individuals who have been ill for some time and who may have made undue dietary restrictions, resulting in an inadequate intake of nutrients. In addition, changes due to the disease itself may impose further nutritional demands, in order to hasten healing of tissue or to compensate for poor absorption. Such extra requirements would justify an increase in all the food groups, above the level recommended for the normal diet. For example, when this diet is used for reduction of gastric acidity, the number of meals and distribution may be given in 6 or more small feedings per day. Since protein-containing foods are effective in buffering the acidity of the stomach, it will be advantageous to fortify fluid milk with sufficient non-fat milk solids at least to double the natural protein content of milk, thus totaling approximately 70 gm. protein per quart. In this case,

TABLE 11—NUTRITIVE CONTENT OF SOFT AND LOW-FIBER DIET* (135 Gm. Protein; 2,575 Calories)

DAILY FOOD INTAKE	QUANTITY		CAL- ORIES†	FOODSTUFFS			MINERALS		VITAMINS				
	Weight (Gm.)	Approximate Measure		Pro- tein (Gm.)	Fat (Gm.)	Carbo- hydrate (Gm.)	Ca (Gm.)	Fe (Mg.)	A (I.U.)	Ascorbic Acid (Mg.)	Thia- mine (Mg.)	Ribo- flavin (Mg.)	Niacin EQUIVA- lent (Mg.)
Milk, whole.....	976	1 qt.	660	34	38	48	1.16	0.8	1,560	10	0.36	1.68	9.2
Milk, non-fat solids ..	100	1-1 1/3 cups	330	34	.....	48	1.16	0.8	30	10	0.36	1.68	8.8
Eggs.....	108	2 medium	150	12	12	Trace	0.06	2.6	1,100	.....	0.10	0.28	3.6
Meat, poultry, fish, cooked; or cheese†...	120	4 oz. E.P.	300	28	20	.....	0.10§	3.8	6,610	4	0.27	0.74	10.8
Bread, white, enriched	180	6 slices	480	16	6	.....	0.16	3.6	.....	.....	0.48	0.26	6.6
Cereal, refined, en- riched.....	20	1/2 cup	80	3	1	.....	0.03	0.6	.....	.....	0.08	0.04	0.8
Potato, cooked.....	100	1 medium	85	2	.....	19	0.01	0.7	20	14	0.09	0.03	1.3
Vegetable, green or yel- low, cooked||.....	100	1/2 cup	30	2	.....	6	0.06	1.1	5,325	13#	0.06	0.11	1.3
Vegetable, other, cooked**.....	100	1/2 cup	35	2	.....	8	0.02	0.8	470	11#	0.06	0.05	0.5
Fruit juice, citrus.....	123	1/2 cup	50	1	.....	13	0.02	0.2	135	56	0.06	0.02	0.2
Fruit, other, cooked, sweetened††.....	100	1 serving	75	.....	.....	19	0.01	0.3	410	2	0.02	0.02	0.4
Subtotal.....	.....	.....	2,275	134	77	266	2.79	15.3	15,660	120	1.94	4.91	43.5
Separated fats or oil..	20	4 level teaspoons	180	.....	.....	.....	.....	.....	220	.....	.....	.....	.....
Sugar.....	30	6 level teaspoons	120	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total*.....	.....	.....	2,575	134	.....	.....	2.79	15.3	15,880	120	1.94	4.91	43.5

* The mineral, vitamin, and protein content of this diet will meet or exceed the Recommended Dietary Allowances (Table 3) for a normal sedentary man (70 kg.) or a physically active woman (58 kg.). To meet additional caloric needs, further amounts of the above foods may be used, plus other sugars, starches, and fats (see Tables 35 and 36).

† Calories have been rounded off to nearest 5.

‡ Weighted on average food consumption data (except liver). If 2 1/2-oz. liver are not used weekly, the vitamin A value and ascorbic acid must be discounted completely.

§ If 4 oz. Cheddar-type cheese are not used during a 10-day period, an additional 100 gm. milk daily will supply equivalent calcium.

|| Asparagus, carrots, green beans, yellow squash, pumpkin, spinach, and other greens.

For canned vegetables, reduce by one-half.

** Beets, peas, summer squash, and tomato juice or tomato purée.

†† Applesauce, pear, peach, apricot, plum, and sweet cherries. Portion sizes have been adjusted to provide equivalent carbohydrate and caloric values as in Table 24.

TABLE 11A

DESCRIPTION OF THE DAILY FOOD PLAN FOR THE SOFT AND
LOW-FIBER DIET*

(135 Gm. Protein; 2,575 Calories; Derived from Table 11)

Daily Food Plan†	Description
MILK GROUP	
1 qt. fluid, whole milk	One quart of fluid whole milk contains <i>660 calories and 34 gm. protein</i> . One pint evaporated milk or 1 cup whole milk solids may be substituted for 1 qt. fluid whole milk.
1-1½ cup (depending on the brand) non-fat milk solids	One-1½ cups non-fat milk solids contains approximately <i>330 calories and 34 gm. protein</i> . This may be added to the 1 qt. of fluid whole milk <i>or</i> incorporated into cereal, desserts, mashed potatoes, or cottage cheese.
	The amounts of fluid whole milk and non-fat milk solids indicated above contain important amounts of protein, calcium, phosphorus, and the B complex.
MEAT AND EGG GROUP	
6 meat equivalents	<i>One meat equivalent</i> is approximately equal to 1 oz. cooked (edible portion) beef, veal, pork, lamb, poultry, fish, cheese or 1 egg. Each equivalent contributes approximately <i>7 gm. protein and 75 calories</i> . Liver and other glandular meats are exceptional sources of iron, vitamin A, and the B complex.
VEGETABLE AND FRUIT GROUP	
4 servings	<i>A dark-green or yellow vegetable is important daily for vitamin A value</i> . Asparagus, carrots, green beans, yellow squash, pumpkin, spinach, and other greens are in this group. Additional vegetables commonly used include beets, peas, summer squash, and tomato juice or tomato purée. Other vegetables may be used as tolerated by the patient. Yellow squash, pumpkin, carrots, beets, and peas contain approximately <i>35 calories</i> per serving. The others are negligible in calories.
	<i>One-half cup citrus juice or 1 cup tomato juice daily will contribute an important part of the vitamin C needed daily</i> . Approximately <i>40 calories</i> per serving come from this source. Other fruits without skins or small seeds may be used. One serving of sweetened fruit may contain between <i>75 and 100 calories</i> .

* If any omissions or changes are made in this food plan, it should be reassessed for nutrient content by reference to Table 11.

† *Foods to restrict*: This diet has become increasingly liberalized and individualized to the extent that restriction which would apply to all patients would be difficult to name (14). However, foods highly flavored with pepper, cloves, mustard, and possibly nutmeg are commonly omitted. Foods which are "overfried" or overcooked to the extent of becoming potential mechanical irritants are also commonly omitted. Foods such as bran, corn, dried beans, nuts, raisins, and fruits with small seeds and skins are also commonly avoided in view of the relatively high-fiber content.

TABLE 11A—Continued

Daily Food Plan†	Description
CEREAL-BREAD-POTATO GROUP	
8 servings	<p><i>One serving provides approximately 70 calories and is equal to 1 slice enriched bread, ½ cup potato, ½ cup cooked macaroni, noodles, spaghetti, rice, corn-meal or ½ cup cooked cereal or ¾ cup refined flake-type cereal. For other equivalents in calories see Table 25. Other substitutes may be added as tolerated by the individual.</i></p>
FATS AND SWEETS	<p><i>Without this group the diet contains approximately 2,000–2,300 calories (depending on the use of skim rather than whole milk indicated above). Six teaspoons sugar, jelly, or honey add about 120 calories. Four teaspoons fat or oil add about 225 calories. For additional calories in desserts see Tables 35 and 36.</i></p>

it is well to add sufficient eggs, citrus juice, and other foods to exceed the Recommended Dietary Allowances (Table 3, p. 13) for the normal individual. Special adaptations may be made to suit the needs of any one individual and with a full awareness of the nutritive content by reference to Table 11.

The nutritive content of the soft and low-fiber diet is indicated in Table 11, showing approximately 135 gm. protein and 2,500 calories. Minerals and vitamins exceed the levels indicated in the Recommended Dietary Allowances (Table 3) for the normal individual. A description of the daily food plan and a sample menu pattern and sample meals appear in Tables 11A and 11B. It is intended that appropriate adaptations of this plan be made in food selection or in calories and other nutrients to suit individual needs. However, if changes or omissions are made in any of the food groups, a reassessment of the nutrient content should be made by reference to Table 11.

TABLE 11B

MENU PATTERN AND SAMPLE MEALS FOR SOFT AND LOW-FIBER DIET
(135 Gm. Protein; 2,575 Calories; Derived from Table 11)

Sample Menu Pattern*

Sample Meals*

A.M.

$\frac{1}{2}$ cup citrus juice or 1 cup tomato juice
1 egg
 $\frac{1}{2}$ cup cooked refined cereal or $\frac{3}{4}$ cup flake-type with milk (containing milk solids) and sugar†
1 slice enriched toast with spread†
Coffee or tea if desired

Tomato juice
1 egg
Cream of wheat (with milk and non-fat milk solids) with sugar†
Toast with spread†
Coffee

Noon

2 oz. tender meat, poultry, fish, or cheese
 $\frac{1}{2}$ cup potato or alternate
Cooked vegetables as asparagus, carrots, spinach, yellow squash, pumpkin, or other greens; other vegetables may be used as tolerated
Fruit (no skin or seeds)
1 slice enriched bread with spread†
1 glass milk (containing non-fat milk solids)
Dessert†

Roast beef
Mashed potato
Asparagus tips
Sliced peaches
Enriched bread with spread†
1 glass milk (containing non-fat milk solids)
Plain cake†

P.M.

Soup (made from milk containing non-fat milk solids)
2 oz. (edible portion) cooked meat, poultry, fish, cheese or 2 eggs
1 cup rice, spaghetti, noodles, potato, or alternate*
Cooked vegetables (as at noon)
1 glass milk (containing non-fat milk solids)
2 slices enriched bread with spread† or alternate*
Dessert†

Cream of tomato soup
Tuna with rice casserole
Peas
1 glass milk (containing non-fat milk solids)
2 slices enriched bread or alternate*
Ice cream†

Between

Eggnog or milk beverage

Eggnog

* See Table 11A for alternates and total amounts to use daily.

† Six teaspoons sugar (120 calories) and 4 teaspoons fat (180 calories) may be used during day, or, if a substitution is desired for the 300 calories calculated in sugar and fat, $\frac{1}{2}$ cup ice cream, plain pudding, custard, or gelatin dessert may add 150-300 calories. One serving plain cake may add 200-300 calories (see Tables 35 and 36 for additional caloric values).

REFERENCES

1. WILLIAMS, R. D., and OLMSTED, W. H. The effect of cellulose, hemicellulose and lignin on the weight of the stool: a contribution to the study of laxation in man, *Nutrition*, **11**:433-49, 1936.
2. OLMSTED, W. H., and WILLIAMS, R. D. Carbohydrates of certain vegetables and fruits, *Proc. Soc. Exper. Biol. & Med.*, **40**:586, 1939.
3. HUMMEL, F. C., SHEPHERD, M. L., and MACY, I. G. Effect of changes in food intakes upon the lignin, cellulose, and hemicellulose content of diets, *J. Am. Dietet. A.*, **16**:199-207, 1940.
4. CHATFIELD, C., and ADAMS, G. Proximate composition of American food materials. (U.S. Department of Agriculture Circular No. 549.) 1940.
5. SIMPSON, J. I., and HALLIDAY, E. G. Chemical and histological studies of the disintegration of cell-membrane materials in vegetable during cooking, *Food Research*, **6**:189-206, 1941.
6. KRAUSE, M. V. Some modern concepts concerning hospital diets, *J. Am. Dietet. A.*, **20**:610-12, 1944.
7. COMMITTEE ON PREPARATION FACTORS, NATIONAL CO-OPERATIVE MEAT INVESTIGATIONS. Meat and meat cookery, p. 76. Chicago: National Live Stock and Meat Board, 1942.
8. ———. *Ibid.*, p. 32.
9. HALLIDAY, E. G., and NOBLE, I. T. Food chemistry and cookery, p. 35. Chicago: University of Chicago Press, 1943.
10. SCHNEIDER, M. A., DELUCA, V., JR., and GRAY, S. J. The effect of spice ingestion upon the stomach, *Am. J. Gastroenterol.*, **26**:722-32, 1956.
11. SOLLMANN, T. A. A manual of pharmacology, pp. 265-67. Philadelphia and London: W. B. Saunders Co., 1942.
12. DUNCAN, G. C. Some nutritional hazards of the hospitalized patient, *J. Am. Dietet. A.*, **25**:330-38, 1949.
13. POLLACK, H., and HALPERN, S. L., with the collaboration of the COMMITTEE ON THERAPEUTIC NUTRITION, FOOD AND NUTRITION BOARD, NATIONAL RESEARCH COUNCIL. Therapeutic nutrition. (Publication No. 234.) 1952.
14. Is there a rationale for the bland diet? *J. Am. Dietet. A.*, **33**:608-9, 1957.
15. BARRON, J., and FALLIS, L. S. Tube feeding with natural foods in elderly patients, *J. Am. Geriatrics Soc.*, **4**:400-404, 1956.
16. BARRON, J., PRENDERGAST, J. J., and JOCZ, M. W. Food pump: new approach to tube feeding, *J.A.M.A.*, **161**:621-22, 1956.

Chapter 5 *Modifications in Calories*

CALORIE-RESTRICTED DIETS

The low-caloric diet is a modification of the normal diet pattern, in that the prescribed allowance has a caloric value below the total maintenance energy requirement for the day, thus providing for a depletion of body fat; protein, minerals, and vitamins remain at or above those given in the *Recommended Dietary Allowances, Revised, 1958* (Table 3).

Caloric allowance.—Since weight may be lost on any level of calories below the number required to *maintain the actual weight of an individual*, it becomes a matter of arriving at an allowance below maintenance which is tolerable to the patient and which permits a rate of weight loss satisfactory to both the physician and the patient.

In making an accurate estimate of caloric needs for maintenance of the actual body weight, a reliable record of activity during a 24-hour period and the food intake would be helpful. In lieu of this, a gross estimate of caloric need may be made by using 12–15 calories per pound as an approximation of the needs of a sedentary adult. Thus a woman weighing 150 pounds might need between 1,800 and 2,250 calories to maintain her actual weight. A more reliable estimate of caloric expenditure may be made by reference to the values compiled by Passmore and Durnin from direct observations of energy expenditure under various conditions of work, recreation, and rest (see Appendix X, Table 51, p. 194).

In estimating the rate of weight loss which might be expected, a deficit of 500 calories per day under maintenance needs may be used

as a gross guide. Such a deficit may be expected to bring about a loss in body weight in the range of 1 pound per week. The exact loss on the scale, however, will be influenced by factors affecting water balance, heat loss, metabolism, activity, and the presence of disease. Most women lose weight satisfactorily on diets between 1,000 and 1,500 calories and most men on diets between 1,500 and 2,000.

Nutrient content.—The patterns of diet and modifications which have been outlined in Tables 12, 12A, and 12B for a calorie-restricted diet for adult, for adolescent, or for use during pregnancy are all based upon amounts of the essential food groups which provide levels of protein, minerals, and vitamins indicated in the *Recommended Dietary Allowances, Revised, 1958* (Table 3). These plans have the advantage of being the most likely to provide for the maintenance of good nutritional health, and, as such, they provide the basis for a long-term dietary program of weight control.

If, in each case, foods for the dietary program are derived from well-liked, familiar foods which suit various ethnic and cultural habits, the likelihood of the patient's maintaining a permanent program of weight control is greatly increased. This individualization should be possible in large degree with the wide variety of alternates suggested within each essential food group; however, if any changes are made in the amounts of the essential food groups, the nutrient content should be reassessed by reference to Tables 2, 3, and 7.

Preparation.—It will be necessary to take advantage of ways of cooking and flavoring foods that do not depend on the use of fats and sweets, unless these have been planned as part of the regimen. The suggestions below are only a few of many possibilities for obtaining flavorful food.

Aluminum foil serves to protect meat, poultry, or fish from fat and oil while baking or roasting or in frying in the same pan used by the family. Salt, pepper, spices and herbs, onion, garlic, or green pepper may be used as desired.

Meat or fish simmered or baked in a tomato sauce (canned tomatoes, green pepper, mushrooms, onions, garlic, salt, spices, or herbs) also provides a convenient method of cooking without added fat or oil.

Vegetables may be cooked together for flavor or boiled in bouillon.

Mint, spices, or herbs provide variety in flavor; or small amounts of dried cheese, such as Parmesan, Romano, or American, may be added to the vegetable at the table. A hot, French-type dressing may also be used to add interest to cooked vegetables. This may be made from tomato juice or tomato purée flavored with lemon or vinegar, grated onion, celery, garlic, salt, horse-radish, spices, and herbs to suit the taste. Artificial sweetener may be added if desired. This dressing serves as a good French-type dressing on salads also. The calories are negligible. Mineral oil is not a satisfactory product for use in salad dressing. Curtis (1) has calculated that each ounce of mineral oil will dissolve 140,000 I.U. of carotene at body temperature and 120,000 I.U. at room temperature. Since it has been shown also that the ingestion of liquid petrolatum or mineral oil is capable of interfering with absorption of vitamin D, calcium, phosphorus, and vitamin K, it has been concluded by the Council on Foods and Nutrition of the American Medical Association (2) that there can be no justification for the incorporation of mineral oil in foods.

Desserts may be prepared by combining the milk and eggs from the food allowance into eggnog, flavoring with extract, and sweetening with an artificial sweetener. This may be baked as custard or frozen as eggnog ice cream. The addition of the fruit allowance to this dessert will add further variety. Rennet tablets added to flavored milk will also provide attractive milk desserts. Fruit whips may be made from the fruit allowance, unsweetened gelatin, or egg white.

If a patient must eat in a restaurant or cafeteria, it is generally more satisfactory to select plain foods such as roasted or broiled meat rather than stews or fricassees, to select salads without dressing and plain fresh fruits rather than other desserts.

Maintenance diet.—After reaching the desirable weight, it will become necessary to establish a level of calories on which weight is maintained. Obviously, it will not be possible to go back to the old habits of eating and inactivity without regaining weight. A gross guide to the level of calories needed may be deduced from the rate of weight loss and the caloric intake during the final period of reducing. For example, if the patient has been losing at the rate of $\frac{1}{2}$ lb. per week in the final weeks of reducing, it is probable that an additional 200–300 calories per day will be sufficient to maintain his weight.

TABLE 12

DESCRIPTION OF FOOD PLAN FOR CALORIE-RESTRICTED DIETS FOR AN ADULT
(80 Gm. Protein; 1,385 Calories; Derived from Normal Diet, Table 2)

Daily Food Plan	Description
MILK	
1 pt. skim	One pint skim milk contains 165 calories, 17 gm. protein, and important amounts of calcium, phosphorus, and the B complex. One pint of buttermilk made from skim milk or $\frac{1}{2}$ – $\frac{2}{3}$ cup non-fat dry milk (depending on brand) may be substituted for this.
MEAT GROUP	
6 meat equivalents	One meat equivalent is approximately equal to 1 oz. (edible portion, weighed after cooking) beef, veal, lamb, pork, poultry, fish, cheese or 1 egg. The six equivalents may be distributed throughout the day as desired. Liver and other variety meats are exceptional sources of vitamin A, iron, and the B complex. One ounce of cooked meat or 1 egg may contain approximately 7 gm. protein and 75 calories.
VEGETABLE AND FRUIT GROUP	
6 servings	<p>A dark-green or deep-yellow vegetable is important each day for its vitamin A value. Asparagus, green beans, broccoli, carrots, green peppers, winter squash, pumpkin, and other greens make up this group. Carrots, winter squash, and pumpkin contain about 35 calories per $\frac{1}{2}$-cup serving. The others will be negligible.</p> <p>Other vegetables, as beets, cabbage, cauliflower, celery, cucumber, eggplant, lettuce, tomatoes, mushrooms, onions, peas, or turnips, contribute varied amounts of all nutrients. Beets, onions, peas, or turnips may contribute about 35 calories per $\frac{1}{2}$-cup serving. Others will be negligible.</p> <p>Citrus fruit or other fruit rich in vitamin C is important each day. One orange or $\frac{1}{2}$ cup juice or $\frac{1}{2}$ grapefruit or $\frac{1}{2}$ cup juice or 1 cup tomato juice or 1 cup strawberries or 1 cup red raspberries or $\frac{1}{4}$ cantaloupe or 1 large tangerine contains about 40 calories per serving and important amounts of vitamin C.</p> <p>Other fruits, as 1 apple or 1 peach or 1 pear or 2 prunes or 4 halves apricots or 12 grapes or $\frac{1}{2}$ banana, contribute varied amounts of nutrients and contain about 40 calories per serving. For equivalent amounts of other fruits see Table 24, p. 79. If sugar or syrup is included, additional calories must be calculated.</p>

TABLE 12—*Continued*

Daily Food Plan	Description
BREAD-CEREAL-POTATO-LEGUME GROUP	
7 servings	<i>One serving provides approximately 70 calories, important amounts of the B complex, and iron. One serving is equal to 1 slice enriched or whole-grain bread, $\frac{1}{2}$ cup white potato, $\frac{1}{4}$ cup sweet potato, $\frac{1}{2}$ cup corn, $\frac{1}{2}$ cup cooked macaroni, noodles, spaghetti, rice, cornmeal, $\frac{1}{2}$ cup cooked dried beans or peas, $\frac{1}{2}$ cup cooked cereal, $\frac{3}{4}$ cup flake-type cereal, 2 Graham crackers, or 5, 2-inch-square soda crackers. For other equivalents see Table 25, p. 80.</i>

FATS AND SWEETS

Without this group the calories for the day approximate 1,385. If 1 level teaspoon fat or oil is used on bread, in vegetables, or in cooking, about 45 calories will be added. One thin slice crisp bacon, 2 tablespoons light cream or 1 tablespoon heavy cream, 1 teaspoon mayonnaise or oil, 1 tablespoon cream cheese or French dressing, 5 small olives, or 6 small nuts contain about 45 calories each.

One level teaspoon sugar, jelly, or honey in cooking, on cereal, on fruit, or in coffee adds 20 calories. One-half cup ice cream, pudding, or gelatin dessert may add between 150 and 300 calories; and 1 serving cake or pie between 300 and 700 calories (see Tables 35 and 36 for additional caloric values).

MODIFICATIONS OF THE CALORIE-RESTRICTED DIET

1,385 calories, using additional meat.—If more meat is desired, 1 additional meat equivalent (1 oz.—edible portion—cooked meat) may be substituted for 1 serving of the bread group without a significant change in calories. Other rearrangements or omissions should be assessed by reference to Table 2.

1,600 calories, for use during pregnancy.—Since the normal diet should be supplemented with 1 pt. of skim milk (165 calories) and 1 meat equivalent (75 calories) to meet the Recommended Dietary Allowances (Table 3) for the second half of pregnancy, the diet will become approximately 1,625 calories if no added fats and sweets are used. For other changes in the daily food plan, the diet should be reassessed by reference to Table 2. The use of iodized salt in regions where iodine is lacking may be important during pregnancy.

1,600 calories, for use during adolescence.—In view of the increased dietary allowances recommended for growth during adolescence, 1 pt. of milk and 1 meat equivalent have been added (Table 7). If the quart of milk indicated is used as skim milk and 1 meat equivalent is added, the diet becomes approximately 1,600 if no fats or sweets are used. Any omissions or rearrangements should be reassessed by reference to Tables 3 and 7 in the text.

1,200-calorie diet for an adult.—If 3 servings of the bread-potato-cereal-legume group are omitted from the Daily Food Plan indicated above, the diet will become approximately 1,200 calories. Iron and the B complex will be correspondingly lowered. Reference may be made to Table 3, *Recommended Dietary Allowances, Revised, 1958*, to determine whether this reduction is desirable.

1,800-calorie diet.—In this case 350 calories may be added from any of the food groups desired by the patient. 350 calories may be added from the use of 4 oz. meat group, or from 4 servings of the bread group, or from additional fats and sweets. Additional caloric values may be noted from Tables 35 and 36.

TABLE 12A
MENU PATTERN AND SAMPLE MEALS FOR A CALORIE-RESTRICTED
DIET FOR AN ADULT*
(80 Gm. Protein; 1,385 Calories; Derived from Tables 2 and 12)

DAILY FOOD PLAN†	SAMPLE MENU PATTERN	SAMPLE MEALS
	A.M.	
MILK GROUP 1 pt. skim	1 citrus fruit or $\frac{1}{2}$ cup juice 1 egg $\frac{1}{2}$ cup enriched or whole-grain cereal (cooked) or $\frac{3}{4}$ flake-type cereal, or alternate 1 slice toast Coffee or tea if desired	Sliced orange Poached egg on toast Flake-type cereal Milk, skim Coffee or tea if desired
MEAT GROUP 6 equivalents‡ <i>One equivalent equals 1 oz. edible portion of cooked beef, veal, lamb, pork, poultry, fish, cheese, or 1 egg)</i>	Noon	
VEGETABLE AND FRUIT GROUP 6 servings <i>A dark-green or deep-yellow vegetable daily for vitamin A value</i> <i>A citrus fruit or other fruit rich in vitamin C daily</i>	3 oz. (3 equivalents) lean meat, poultry, or fish $\frac{1}{2}$ cup potato or substitute Dark-green or deep-yellow vegetable Other vegetable 1 fruit 2 slices enriched or whole-grain bread or alternate 1 glass skim milk	Broiled ground lean meat Baked potato Spinach Tomato and lettuce salad with special dressing§ $\frac{1}{4}$ cantaloupe 1 slice bread 2 Graham crackers 1 glass skim milk
BREAD-CEREAL-POTATO-LEGUME GROUP 7 servings	P.M.	
FATS AND SWEETS (<i>Without this group the diet contains 1,385 calories</i>)||	2 oz. (2 equivalents) lean meat, poultry, fish, cheese, or 2 eggs Vegetable 1 fruit 1 glass skim milk 2 slices enriched or whole-grain bread or alternate	Sandwich: 1 slice cheese 1 slice meat 2 slices bread Tossed salad with special dressing§ Fresh strawberries Skim milk

* See Table 12B for modifications during pregnancy or adolescence. For other caloric levels, see Table 12.

† See Table 12 for alternates or equivalents within each food group.

‡ If additional meat is desired, 1 meat equivalent (1 oz. lean meat) may be added, and 1 serving from bread group omitted. Other rearrangements or omissions should be reassessed by reference to Tables 2 and 3.

§ See text, p. 46, for discussion of food preparation.

|| If 1 level teaspoon sugar, jelly, or honey is used, approximately 20 calories will be added. If 1 level teaspoon fat or oil is included, approximately 45 calories will be added. A dessert, such as ice cream, pudding, or gelatin dessert, may add 150-300 calories; pie or cake may add 300-700 calories (see Tables 35 and 36 for additional caloric values).

TABLE 12B

MENU PATTERN AND SAMPLE MEALS FOR A CALORIE-RESTRICTED
DIET DURING PREGNANCY OR ADOLESCENCE

(100 Gm. Protein; 1,600 Calories; Derived from Tables 2 and 7)

DAILY FOOD PLAN*	SAMPLE MENU PATTERN	SAMPLE MEALS
	A.M.	
MILK GROUP 1 qt. skim MEAT GROUP 6 equivalents† <i>(One equivalent equals 1 oz. edible portion cooked beef, veal, lamb, pork, poultry, fish, cheese, or 1 egg)</i>	1 citrus fruit or $\frac{1}{2}$ cup juice 1 egg $\frac{1}{2}$ cup cooked, enriched, or whole-grain cereal or $\frac{3}{4}$ cup flake-type cereal or alternate One slice enriched or whole-grain toast Skim milk Coffee or tea if desired	$\frac{1}{2}$ grapefruit Poached egg on toast $\frac{3}{4}$ cup flake-type cereal Skim milk Coffee or tea if desired
	Noon	
VEGETABLE AND FRUIT GROUP 6 servings <i>A dark-green or deep-yellow vegetable daily for vitamin A value</i> <i>A citrus fruit or other fruit rich in vitamin C daily</i>	2 oz. (2 equivalents) lean meat, poultry, fish, cheese, or 2 eggs Vegetable 1 fruit 2 slices enriched or whole-grain bread or alternate 1 glass skim milk	Sandwich: 2 slices lean meat 2 slices bread Heart of lettuce with special dressing‡ Fresh pear 1 glass skim milk
	P.M.	
BREAD-CEREAL-POTATO-LEGUME GROUP 7 servings FATS AND SWEETS <i>(Without this group the diet contains approximately 1,600 calories)§</i>	3 oz. (3 equivalents) lean meat, poultry, fish, or cheese $\frac{1}{2}$ cup potato or substitute Dark-green or deep-yellow vegetable Other vegetable 1 slice bread or substitute 1 fruit 1 glass skim milk	Lean roast beef Potato Frozen green beans with sweet-sour sauce‡ Raw carrot sticks 1 small hot roll Baked apple 1 glass skim milk
	Between	
	1 glass skim milk with - 2 Graham crackers	1 glass skim milk with 2 Graham crackers

* See Table 12 for variety in selection within each food group.

† If additional meat is desired, 1 oz. lean meat may be added and 1 serving of the bread group omitted without alteration in calories. Other rearrangements or omission should be reassessed by reference to Tables 2, 3, and 7.

‡ See text, p. 46, for discussion of food preparation.

§ If 1 level teaspoon sugar, jelly, or honey is used, 20 calories will be added. If 1 level teaspoon fat or oil is used, 45 calories will be added (see Tables 35 and 36 for additional caloric values).

HIGH-CALORIC DIET

The high-caloric diet is a prescribed food allowance which has a caloric value above the total energy requirement per day, thus providing for storage of fat; proteins, minerals, and vitamins are at or above the levels in the normal diet.

Appraisal of the home dietary intake.—A deficit in the caloric content of the patient's customary food intake is frequently accompanied by a deficiency in proteins, minerals, or vitamins. This means that the dietitian is faced with the problem of obtaining reliable information regarding the over-all nutritive content of the usual food intake.

Caloric allowance.—The levels of caloric intake to be recommended may vary, depending upon the individual's energy requirement for maintenance and the rate of weight gain desired.

A guide to caloric allowances for the normal individual at moderate activity has been recommended by the Food and Nutrition Board of the National Research Council (Table 3). More specific estimates under various conditions of work, recreation, and exercise have been compiled by Passmore and Durnin (3). (See Appendix X, p. 194).

A gross guide to the number of calories which must be added above the level of calories required for maintenance of body weight is the allowance of 500 additional calories per day. This increase may permit a gain of approximately 1 pound of body tissue per week. However, the exact gain may vary, depending upon the degree of activity and upon factors affecting heat loss, the water balance, and the presence of disease.

Dietary recommendations.—Since food habits are most easily and permanently changed when consideration is given to the ethnic and cultural pattern of eating, the simplest place to start is with a food diary in which the patient has recorded his self-chosen food intake. The sufficiency of this diet for various nutrients may be assessed by reference to the outlines of normal diet in Tables 2, 6, and 7.

The next step that will be of the greatest nutritional advantage to the patient will involve the addition of any foods from the essential four groups which may be in deficit and which are sufficiently acceptable to the patient to permit the use of additional amounts.

Several practical suggestions for supplementing the diet by 500 calories are listed here.

MILK GROUP

500 calories

A milk beverage containing about 500 calories may be prepared by adding $\frac{1}{2}$ – $\frac{3}{4}$ cup (depending on the brand) non-fat dry milk solids (165 calories) to 1 pint of whole milk (330 calories). The addition of flavoring, such as 1 tablespoon sugar (60 calories) and 2 teaspoons cocoa (35 calories), will add another 100 calories.

If the milk is preferred plain, the non-fat dry milk solids may be incorporated into such foods as cottage cheese, mashed potato, macaroni, and cereals.

Or

MEAT-EGG-BREAD

GROUP

500 calories

A sandwich containing approximately 500 calories may be prepared by using two slices of meat or cheese (150 calories); 1 tablespoon mayonnaise or fat spread for bread (135 calories); and 2 slices bread (150 calories). One egg in beverage, dessert, or plain will add about 75 calories.

Or

CEREAL AND MILK

GROUP

500 calories

Cereal and milk with a banana or other fruit may provide about 500 calories if used as follows:

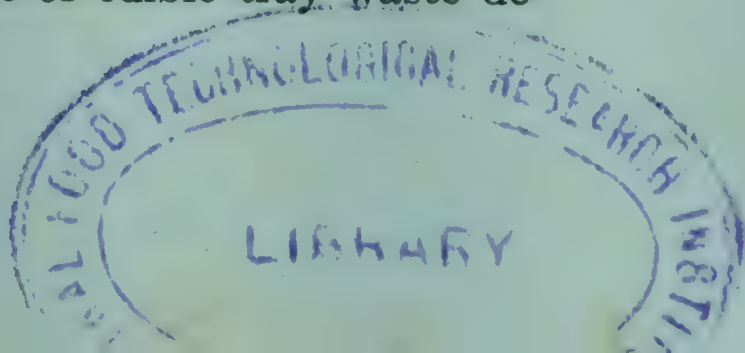
One cup cooked cereal or $1\frac{1}{2}$ cups flake-type cereal (150 calories) may be served with 1 cup whole milk (165 calories) to which $\frac{1}{4}$ – $\frac{1}{3}$ cup (depending on the brand) non-fat dry milk solids (85 calories) has been added. One tablespoon sugar (60 calories) and a sliced banana (80 calories) will bring the total to approximately 500 calories. For some individuals this serves as an enjoyable bedtime snack.

Or

FATS AND SWEETS

For calories obtained from additional desserts and sweets or from fat and oils see Tables 35 and 36.

Distribution of meals throughout the day.—In some instances, an increase in the number of feedings may be indicated. In others, a decrease in the number of feedings per day will result in a better appetite and an increase in total food consumption. Lundgren and Hammarsten (4) report that the amount of edible tray waste de-



creased significantly when the quantity of between-meal nourishment was reduced. Keeton (5) has also reported highly significant increases in caloric intake when the number of meals was reduced to one or two per day.

Plan of diet.—For a sample menu and plan of meals see the appropriate plan of normal diet. Supplements as suggested above may then be added; or other possibilities may be developed by reference to Tables 35 and 36.

If a high-caloric modification of a therapeutic or a liquid or soft diet is desired, the respective evaluations, menu patterns, and meal plans should be noted, and adaptations made to suit individual needs.

REFERENCES

1. CURTIS, A. C. The mineral oil vitamin A problem, *Virginia M. Monthly*, **69**:235-36, 1942.
2. COUNCIL ON FOODS AND NUTRITION, AMERICAN MEDICAL ASSOCIATION. Mineral oil (liquid petrolatum) in foods, *J.A.M.A.*, **123**:967-69, 1943.
3. PASSMORE, R., and DURNIN, J. V. G. A. Human energy expenditure, *Physiol. Rev.*, **35**:801-40, 1955.
4. LUNDGREN, E. M., and HAMMARSTEN, J. F. Effect of between-meal nourishments on tray food waste, *J. Am. Dietet. A.*, **25**:873-74, 1949.
5. KEETON, R. W. Influence of distribution of meals on appetite in the sick, *J. Am. Dietet. A.*, **26**:336-44, 1950.

<i>Chapter 6</i>	<i>Modifications in Fat Intake</i>
------------------	--

A food allowance may be modified in terms of a prescribed level of fat, in terms of the percentage of fat calories, or in terms of the amount of, or ratio between, fatty acids. Other nutrients should remain at a level suitable for nutritive efficiency.

"AVERAGE" FAT CONSUMPTION IN THE UNITED STATES

The kind and extent of the changes which would be necessary in making modifications in the level of fat, the proportion of calories from fat, or the amounts of and ratio between fatty acids may be judged in some degree from the contribution of various food groups in the average diet in the United States (Table 13).

An average of 155 gm. fat per person per day was available for consumption in the United States, according to data collected in the 1955 food consumption survey (1), thus accounting for approximately 44 per cent of the total calories. It should be noted, however, that no deductions were made in the survey for food discarded.

Stiebeling (2) has estimated the nutritive content of the average diet to be as follows: calories, 3,200; fat, 155 gm.; protein, 103 gm.; calcium, 1.2 gm.; iron, 18 mg.; vitamin A value, 8,540 I.U.; thiamine, 1.6 mg.; riboflavin, 2.3 mg.; niacin, 10 mg.; ascorbic acid, 106 mg. This "average," however, should be regarded only as a statistical average. Obviously, wide differences will occur in individual food habits.

BASIC DIET—30 GM. FAT

The reduction of fat to approximately 30 gm. may be accomplished by omission of separated fats and oils; by the use of *lean* meat; by substitution of poultry and fish low in fat for part of the customary meat and cheese; by use of skim milk; and by reduction of nuts and baked goods.

The basic plan in Table 14 indicates the kind and amounts of the food groups which will provide approximately 30 gm. fat, 80 gm. protein, and 1,500 calories. This is an adaptation of the basic plan described by Stefanik and Trulson (3).

By using Table 14, the total fat may be reduced from 155 gm. in the average diet to 30 gm.; the saturated fatty acids from 65 to 11 gm.; and the polyunsaturated acids (chiefly linoleic acid) from 16.4 to 5.95. To increase the calories without significant alterations in the fat or fatty acid levels, further additions would have to be made in the sugar and sweets, fruits, vegetables, and grains.

Totals or ratios of saturated, oleic, and polyunsaturated fatty acids may be varied by using different kinds and amounts of fats and oils. Modifications may be made by reference to typical fatty acid analyses of some fats and oils of animal and plant origin in Table 15. For additional values on fatty acid composition for over 250 food items see Tables 41 and 42 (pp. 146–58), taken from Hayes and Rose (4) and Hardinge and Crooks (5). *Fatty Acids in Food Fats*, a short compilation, is also available from the U.S. Department of Agriculture (8).

For a discussion of dietary fat consumption, the chemistry, metabolism, and nutritional role of food fats, possible relation to cardiovascular disease, the consumer's position, and the needs for research, reference may be made to *The Role of Dietary Fat in Human Health* ("National Academy of Science—National Research Council Publication," No. 575 [1958] [32 pp., \$1.00]).

FOOD PREPARATION

Diet containing 30 gm. fat.—Separated fats and oils must be eliminated entirely; and meat should be well trimmed to eliminate fat. Cooking must be limited to boiling or simmering with bouillon or tomato juice and broiling or roasting without added fat. Seasoning may be done with lemon, vinegar, wines, onion, garlic, salts, spices,

TABLE 13*

TOTAL FAT AND SELECTED FATTY ACIDS IN DIETS, BY FOOD GROUP, HOUSEHOLDS IN THE UNITED STATES
(Average per Person per Day from Food Used at Home in Week, April-June, 1955)

Food Group†	Total Fat (Gm.)	Saturated Fatty Acids (Gm.)	Oleic Acid (Gm.)	Linoleic Acid (Gm.)
Beef, veal, lamb.....	22.1	11.0	8.8	0.4
Pork (excl. bacon, salt pork).....	15.1	6.0	7.6	1.5
Poultry, fish.....	4.4	1.2	1.6	0.8
Bacon, salt pork.....	13.4	5.4	6.7	1.3
Lard.....	9.2	3.7	4.6	0.9
Other shortening.....	9.0	2.2	5.8	0.7
Oils, salad dressing.....	9.3	1.9	2.8	4.6
Margarine.....	10.4	2.6	6.4	0.8
Butter.....	10.6	7.0	2.9	0.4
Milk, cream, ice cream, cheese.....	28.0	18.5	7.6	1.0
Eggs.....	5.6	2.0	2.5	0.4
Other foods (purchased baked goods, nuts, fruits, vegetables, etc.).....	18.0	3.6	9.0	3.6
Total	155.1	65.1	66.3	16.4

* From *Food Consumption and Dietary Levels of Households in the United States: Some Highlights from the Household Food Consumption Survey, Spring, 1955* (Agricultural Research Service, U.S. Department of Agriculture, ARS 62-6 [Washington: Government Printing Office, 1957], 0-433306).
† Estimates of quantities of foods "brought into the kitchen" appear on p. 6 in text.

TABLE 14

FAT, FATTY ACIDS, AND CHOLESTEROL IN BASIC DIET CONTAINING 30 GM. FAT*
(80 Gm. Protein; 1,500 Calories)

Food Group	Amount	Calories	Protein (Gm.)	Fat (Gm.)	Cholesterol (Mg.)	Fatty Acids	
						Saturated (Gm.)	Polyunsaturated† (Gm.)
Skim milk.....	2 cups	174	17	0.5	1.4	0.21	0.03
Egg.....	1	77	6	5.5	259.0	1.64	1.48
Lean meat, fish, poultry†...	7 oz.	367	40	21	180.0	8.52	2.50
Fruits and vegetables.....	5 average servings	240	3	1	.....	0.10	0.60
Bread and/or cereals.....	3 average servings	227	6.5	1.5	2.4	0.34	0.75
Potato and substitutes.....	2 average servings	220	7	1	.....	0.10	0.60
Sugar and sweets.....	3 tbsp.	165	.....	.....	.....	.....	.....
Total.....	.....	1,470	79.5	30.5	442.8	10.91	5.96

* Adapted from P. A. Stefanik and M. F. Trulson. Modifying the fatty acid content of the diet, J. Am. Dietet. A., 34:591-95, 1958.
† Chiefly linoleic.
‡ Daily averages based on a 7-day food intake. The figures for meat, fish, and poultry are taken from raw weights for 420 gm. chicken, 315 gm. low-fat fish, 105 gm. liver, and 210 gm. each of lean beef, veal, and lamb per week.

TABLE 14A
DESCRIPTION OF DAILY FOOD PLAN: BASIC DIET—30 GM. FAT
(80 Gm. Protein; 1,500 Calories; Derived from Table 14)

Daily Food Plan*	Description
MILK	
1 pt. skim	<i>One pint skim milk contains 165 calories, 17 gm. protein, and important amounts of calcium, phosphorus, and the B complex vitamins. One pint buttermilk, made from completely skim milk, or $\frac{1}{2}$–$\frac{2}{3}$ cup (depending on brand) of non-fat milk solids is equivalent.</i>
EGG	<i>One egg contributes approximately 7 gm. protein and 75 calories.</i>
MEAT GROUP	
7 oz. raw weight (edible portion)	<i>Seven ounces of lean meat, poultry, or low-fat fish contribute approximately 40 gm. protein, important minerals, and vitamins of the B complex. Liver and eggs are important sources of iron, vitamin A, and the B complex. The fat and fatty acid levels indicated in Table 14 may be attained by the use of 7 oz. of lean beef, veal, and lamb 3 times per week; poultry 2 times per week; low-fat fish between 1 and 2 times per week; and liver 1 time in 2 weeks. For methods of preparation see p. 56 in text.</i>
VEGETABLE AND FRUIT GROUP	
5 servings	<p><i>A dark-green or deep-yellow vegetable is important each day for its vitamin A value. Asparagus, green beans, broccoli, carrots, green pepper, winter squash, pumpkin, and other greens make up this group. Carrots, winter squash, and pumpkin may contain about 35 calories per serving. The others will be negligible.</i></p> <p><i>Other vegetables, as beets, cabbage, cauliflower, celery, cucumber, eggplant, lettuce, mushrooms, onions, peas, tomatoes, or turnips, contribute various amounts of all nutrients. Beets, onions, peas, or turnips may contribute about 35 calories per $\frac{1}{2}$-cup serving. Others will be negligible.</i></p> <p><i>Citrus fruit or other fruit rich in vitamin C is important each day. One orange or $\frac{1}{2}$ cup juice or $\frac{1}{2}$ grapefruit or 1 cup tomato juice or 1 cup strawberries or 1 cup red raspberries or $\frac{1}{4}$ cantaloupe or 1 large tangerine contains about 40 calories per serving and important amounts of vitamin C.</i></p>

* See p. 56 in text for food preparation.

TABLE 14A—Continued

Daily Food Plan*	Description
VEGETABLE AND FRUIT GROUP—Continued 5 servings—Continued	Other fruits, as 1 apple or 1 peach or 1 pear or 4 halves of apricots or 12 grapes or $\frac{1}{2}$ banana, contribute various amounts of all nutrients and contain about 40 calories per serving. For other fruits see Table 24 in text. If sugar or syrup is included, add between 25 and 50 calories per serving.
BREAD OR CEREAL 3 servings	One serving provides approximately 70 calories, important amounts of the vitamin B complex, and iron. One slice enriched or whole-grain bread, $\frac{1}{2}$ cup white potato, $\frac{1}{4}$ cup sweet potato, $\frac{1}{2}$ cup cooked macaroni, spaghetti, or noodles, rice, cornmeal, cooked dried peas or beans, $\frac{3}{4}$ cup flake-type cereal, 2 Graham crackers, or 4 arrowroot cookies.
POTATO OR SUBSTITUTES 2 servings	
SWEETS	Three tablespoons sugar, jelly, or honey add approximately 180 calories.

and herbs instead of fats and oils. Aluminum foil wrapping of meat, poultry, or fish also serves as a convenient method for cooking individual servings which must remain fat-free. In this way meat remains moist and well flavored in addition to being protected from fat, even if placed in the same frying pan with meat for the family.

Salad dressing may be prepared without added oil. Tomato juice or tomato purée may be used as a base, with lemon or vinegar, grated onion, grated celery, garlic, horse-radish, sugar, salt, and pepper added to suit the taste. Other seasoning may be used as desired; but oil must be avoided completely. This dressing may be used to marinate meat or may be served hot as a flavoring for cooked vegetables.

Baked goods must be limited to those prepared without added fat, such as angel-food cake, arrowroot cookies, and Graham crackers. Desserts may include gelatin, fruit, fruit whips made from egg white or gelatin, ices, and puddings or frozen desserts prepared from skim milk. Bread may be spread with jam, jelly, or honey.

Olives, potato chips, popcorn, cheese, gravy, or soups containing fat, avocado, nuts, cream, chocolate, and coconut must be re-

TABLE 14B

MENU PATTERN AND SAMPLE MEALS: BASIC DIET—30 GM. FAT
(80 Gm. Protein; 1,500 Calories;* Derived from Tables 14 and 14A)

DAILY FOOD PLAN†	SAMPLE MENU PATTERN‡	SAMPLE MEALS§
MILK 1 pt. skim	A.M.	
EGG 1	½ cup citrus fruit juice or substitute 1 egg ½ cup cooked enriched or whole-grain cereal or ¾ cup flake-type cereal, or 1 slice enriched or whole-grain toast and jelly Coffee or tea if desired Skim milk and sugar	½ cup orange juice Poached egg Toast Jelly if desired Coffee or tea Skim milk and sugar
MEAT GROUP 7 oz. raw weight of edible portion|| Lean beef, veal, or lamb 3 times per week Low-fat fish 1 or 2 times per week Poultry 2 times per week Liver 1 time in 2 weeks	Noon	
VEGETABLE AND FRUIT GROUP 5 servings Dark-green or deep-yellow vegetable is important for vitamin A value Citrus fruit or other fruit rich in vitamin C is important daily	3 oz. lean meat, poultry, or fish ½ cup potato, rice, spaghetti, or noodles Green or yellow vegetable Other vegetable Fruit 1 glass skim milk 1 slice enriched or whole-grain bread with jelly	Baked chicken Potato Frozen greens Cabbage and green pepper slaw§ Honeydew melon Skim milk Bread and jelly
BREAD OR CEREAL 3 servings	P.M.	
POTATO OR SUBSTITUTE 2 servings	4 oz. lean meat, poultry, fish, or liver ½ cup potato, rice, spaghetti, or noodles Vegetable Fruit 1 glass skim milk 1 slice enriched or whole-grain bread and jelly	Liver, baked in tomato sauce§ Rice with chives Tossed salad with special dressing§ Baked apple Skim milk Bread and jelly
SUGAR Jelly or honey, 3 tablespoons		

* If more calories are needed, the following may be included without significant alteration of fatty acids: 1 teaspoon sugar, jelly, or honey, 20 calories; ½ cup plain gelatin dessert or 1 serving sweetened fruit, 100 calories.

† For variety within each food group see Table 14A for alternates.

‡ For foods to avoid, see p. 56 in text.

§ See p. 56 in text for discussion of food preparation.

|| Based on weekly selection of 420 gm. chicken, 315 gm. low-fat fish, 105 gm. liver, and 210 gm. each of lean beef, veal, or lamb.

stricted. Labels on canned or processed foods must be examined carefully to note any fat content.

Fatty acid modifications.—If the prescribed levels of saturated or unsaturated fatty acids permit of adding fats and oils in the diet, these may be incorporated in cooking, in the salad dressing, as a spread for bread and potatoes, or in a beverage made from the egg

TABLE 15*
TYPICAL FATTY ACID ANALYSES OF SOME FATS OF ANIMAL
AND PLANT ORIGIN†

	SATURATED			UNSATURATED		
	Palmitic	Stearic	Other‡	Oleic	Linoleic	Other
<i>Animal fats:</i>						
Lard	29.8	12.7	1.0	47.8	3.1	5.6§
Chicken	25.6	7.0	0.3	39.4	21.8	5.9§
Butterfat . . .	25.2	9.2	25.6	29.5	3.6	7.2§
Beef fat	29.2	21.0	3.4	41.1	1.8	3.5§
<i>Vegetable oils:</i>						
Corn	8.1	2.5	0.1	30.1	56.3	2.9
Peanut	6.3	4.9	5.9	61.1	21.8	.....
Cotton seed . .	23.4	1.1	2.7	22.9	47.8	2.1
Soybean	9.8	2.4	1.2	28.9	50.7	7.0||
Olive	10.0	3.3	0.6	77.5	8.6	.....
Coconut	10.5	2.3	78.4	7.5	Trace	1.3

* Committee on Fats, *The Role of Dietary Fat in Human Health* (Food and Nutrition Board, National Academy of Sciences-National Research Council, Publication No. 575 [1958]).
† Compositions are in weight percentages of component fatty acids. If values as glycerides are desired, the percentages may be multiplied by the approximate factor 0.95.
‡ Values in this column for butter fat and coconut oil are due to large amounts of acids C₁₂ and below. Peanut oil contains several per cent of C₂₀ and above acids.
§ Mainly hexadecenoic acid; 0.2-0.4 per cent arachidonic acid.
|| Mostly linolenic acid.

and skim milk allotted on the basic diet. Special recipes and suggestions for the incorporation of a particular fat or oil into menus have been discussed by Vail (6) and Brandt (7).

Numerous special-purpose cookbooks have also been published. However, the suitability of a recipe depends on the particular level of fat, the percentage of fat calories, or the proportion of saturated and unsaturated fatty acids prescribed in the individual diet. For this reason, the physician, dietitian, or nutritionist should aid in selecting appropriate recipes.

For a description of a daily food plan, a sample menu pattern, and

sample meals containing 30 gm. fat, see Tables 14A and 14B. Modifications from this basic diet may be made to suit individual needs.

REFERENCES

1. Household food consumption survey, 1955. (U.S. Department of Agriculture, "Agricultural Research Service Reports," Nos. 1-10.) 1957.
2. STIEBELING, HAZEL K. (director, Institute of Home Economics, U.S. Department of Agriculture, Agricultural Research Service). Food and nutrient consumption trends and consumer problems: talk at the American Institute of Nutrition, Chicago, Illinois, April 17, 1957. (Mimeo.)
3. STEFANIK, P. A., and TRULSON, M. F. Modifying the fatty acid content of the diet, *J. Am. Dietet. A.*, **34**:591-95, 1958.
4. HAYES, O. B., and ROSE, G. Supplementary food composition table, *J. Am. Dietet. A.*, **33**:26-29, 1957.
5. HARDINGE, M. G., and CROOKS, H. Fatty acid composition of food fats, *J. Am. Dietet. A.*, **34**:1065-71, 1958.
6. VAIL, GLADYS E. Cooking with fats high in polyunsaturated fatty acids, *J. Am. Dietet. A.*, **35**:119-21, 1959.
7. BRANDT, M. BERTHA. Palatable ways to combine oil with egg-milk mixtures. *J. Am. Dietet. A.*, **35**:121, 1959.
8. GODDARD, VERZ R., and GOODALL, LOUISE. Fatty acids in food fats. (Agricultural Research Service, U.S. Department of Agriculture, "Home Economics Research Reports," No. 7.) March, 1959.

Chapter 7 *Protein Modifications*

The normal food allowance may be modified in terms of a prescribed level of protein, the kind and amount of amino acids, or the character of the protein fraction.

125-GM. PROTEIN DIET

A level of protein above the normal allowance may be indicated most clearly if it is prescribed in terms of grams of protein per kilogram of desirable weight. For the normal, healthy adult, 1 gm. protein per kilogram of desirable weight has been recommended (Table 3). For children, the level will be correspondingly higher per unit of weight (Table 3). For therapeutic purposes, appropriate increases should be specified.

In evaluating proteins, one considers two general aspects: (a) digestibility and (b) biologic value. By "digestibility" is meant the percentage of the consumed protein, measured in terms of nitrogen, that is absorbed. "Biologic value" means the percentage of absorbed nitrogen that is retained by the body and not excreted in the urine. The body requires a definite combination or pattern of amino acids, each in proper amount, for the formation of tissue proteins. If any essential amino acid is supplied in insufficient amounts, then this amino acid will limit the amount of tissue protein made; other amino acids, regardless of the amount present, can be used only to the extent that is required for this tissue protein, and the rest present will be metabolized and the nitrogen excreted in the urine; therefore, the proteins deficient in essential amino acids will have low biologic

values. Although there are exceptions, most vegetable proteins have lower digestibilities and biologic values than do animal proteins. For this reason, most nutritionists and dietitians recommend some source of animal protein in each meal. The dietetic practice of providing half or more of the protein from animal sources permits a wide margin of safety in the normal diet for an adult. In diets for children and in most convalescent diets it is a common practice to provide two-thirds of the protein from animal sources.

As an example of a protein allowance for an adult which has been increased above normal, a diet containing 125 gm. protein and 2,000 calories has been evaluated in Table 16. This daily food plan has been derived from the Normal Diet for an Adult (Tables 2, 2A, and 2B), with the addition of 1-1½ cups (depending on the brand) of non-fat milk solids to 1 quart of fluid skim milk. The total protein for the day then becomes 125 gm. In this illustration, the increase may be obtained by a *high-protein drink*. Sugar and flavoring could be added as appropriate. If the non-fat milk solids are more acceptable in other forms than a drink, they may be added as a dry ingredient to cottage cheese, mashed potatoes, cereal, milk soups, macaroni or spaghetti, puddings, cake, or cookies.

The possibilities of using other of the essential food groups to increase the protein content may be noted by reference to the protein values indicated in Table 16. If a therapeutic modification of a high-protein diet is desired, such as a liquid or soft diet, see the respective tables.

AMINO ACIDS: PHENYLALANINE RESTRICTION

In view of the newer knowledge concerning interrelationships between amino acids, enzymes, hormones, vitamins, and calories, a need has arisen for more information concerning the amino acid content of the diet.

A renewed interest in requirements has come about in part from the recognition of amino acid deficiencies in various parts of the world, particularly as kwashiorkor in infants and young children (1). Holt (2) and Albanese (3) have made observations on amino acid requirements of infants; Leverton, Swenseid, and Reynolds (4) on young women; and Rose and his associates (5, 6) have indicated tentative minimum quantities necessary for maintenance of nitro-

TABLE 16—NUTRITIONAL EVALUATION OF 125-GM. PROTEIN DIET
(2,100 Calories*)

DAILY FOOD INTAKE	QUANTITY		CAL- ORIES†	FOODSTUFFS			MINERALS		VITAMINS				
	Weight (Gm.)	Approximate Measure		Pro- tein (Gm.)	Fat (Gm.)	Carbo- hydrate (Gm.)	Ca (Gm.)	Fe (Mg.)	A (I.U.)	Ascorbic Acid (Mg.)	Thia- mine (Mg.)	Ribo- flavin (Mg.)	Niacin EQUIVA- lent (Mg.)
Milk, skim, fluid.....	984	1 qt.	330	34	.....	48	1.21	1.0	Trace	10	0.39	1.77	9.2
Milk, non-fat solids....	100	1-1½ cups	330	34	.....	48	1.21	1.0	30	10	0.39	1.77	9.2
Meat, poultry, fish, lean, cooked; or cheese‡.....	120	4 oz. E.P.	300	28	20	.....	0.10§	3.8	6,610	4	0.27	0.74	10.8
Bread, whole-grain or enriched white.....	180	6 slices	480	16	6	90	0.16	3.6	.....	.....	0.48	0.26	6.6
Cereal, whole-grain or enriched white.....	20	½ cup	80	3	1	15	0.03	0.6	.....	.....	0.08	0.04	0.8
Potato, cooked.....	200	2 small	170	4	.....	38	0.02	1.4	40	28	0.18	0.06	2.6
Vegetable, green or yellow||.....	100	½ cup	30	2	.....	5	0.09	1.3	6,280	30#	0.08	0.15	1.3
Vegetable, other**.....	200	1 cup	50	2	.....	10	0.06	1.0	450	30#	0.09	0.10	1.0
Fruit, citrus.....	100	1 serving††	40	1	.....	10	0.02	0.2	110	45	0.05	0.02	0.2
Fruit, other.....	.....	2 servings††	80	.....	.....	20	0.03	0.9	1,905	35	0.08	0.09	0.9
Subtotal††.....	.....	.....	1,890	124	27	284	2.93	14.8	15,425	192	2.09	5.00	42.6
Sugar.....	15	3 level tea- spoons	60	.....	.....	15	.....	.....	.....	.....	.....	.....	.....
Fats or oils.....	15	3 level tea- spoons	135	.....	15	.....	.....	.....	165	.....	.....	.....	.....
Total††.....	.....	.....	2,085	124	42	299	2.93	14.8	15,590	192	2.09	5.00	42.6

* To meet additional caloric needs, further amounts of the above foods may be used plus other sugars and starches (see Tables 35 and 36).
† Calories have been rounded off to nearest 5.
‡ Weighted on average food consumption data (except liver). If 2½ oz. liver are not used weekly, the vitamin A value and ascorbic acid must be discounted completely.
§ If 4 oz. Cheddar-type cheese are not used during a 10-day period, an additional 100 gm. milk daily will supply equivalent calcium.
|| Asparagus, broccoli, carrots, green beans, kale, yellow squash, pumpkin, spinach, turnip greens, and other greens.
For canned vegetables, reduce by half.
** Tomato, fresh, canned, or juice; vegetables commonly served raw, as celery, cucumber, lettuce, and cabbage; and other cooked vegetables, as beets, eggplant, onions, rutabagas, and cauliflower.
†† Portion sizes have been adjusted to provide equivalent carbohydrate and caloric values, as in Table 24.
‡‡ Minerals, vitamins, and protein will approximate the Recommended Dietary Allowances (Table 3) for the normal adult.

gen equilibrium in young adult males. In addition, a committee of the Food and Agriculture Organization of the United Nations (7) has recently appraised protein requirements.

Tryptophan has become the first amino acid for which an allowance has been indicated by the Food and Nutrition Board in the *Recommended Dietary Allowances, Revised, 1958* (11). Its sparing action on the need for niacin has been quantitated in terms of 60 mg. tryptophan:1 mg. niacin. Horwitt (8) has discussed the basis for this assumption and its application to the evaluation of dietaries. This may be of particular importance in situations where food patterns have become skewed either for therapeutic reasons or from unusual food habits on the part of the patient.

Phenylalanine is another amino acid which has become of particular interest. Certain mentally retarded children fail to oxidize this amino acid as a result of an enzyme deficiency, and improvement has been brought about in some cases by reducing the phenylalanine in the diet to minimal levels. Wright (9) and Zellweger (10), among others, have reviewed some of the recent developments in the treatment of this disease in infants and children.

In planning a phenylalanine-restricted diet, special consideration must be given to the protein portion of the diet, since natural proteins contain between 4 and 6 per cent phenylalanine. Several methods have been used to bring about a reduction in the phenylalanine content of the diet. Armstrong (11) has used a mixture of pure amino acids to compose the protein portion of the diet. Others (9) have used a hydrolysate of casein which has been passed through a column of activated charcoal. In this way, tyrosine and tryptophan are removed, in addition to the phenylalanine. Another product, a "breast-milk type formula," is suitable for use in infancy and early childhood. When reconstituted in "normal dilution," it is said to provide nutrients in amounts usually found in breast milk. Since certain of these products provide only the protein portion of the diet or the protein and minerals, it is important to note which nutrients are supplied and which must be added to provide a mixture of greatest nutritional sufficiency.

The use of the "breast-milk type formula" in a diet for a twelve-

month-old child is outlined in Table 17, from Karle, O'Donnell, and Ehmke (12).

Recently, new and less costly methods of assay of the amino acid content of foods have resulted in a substantial accumulation of data. These have been compiled by Orr and Watt (13) for eighteen amino acids in 202 food items, both in terms of amino acids per gram of total nitrogen and in terms of amino acids in 100 gm. food. A portion of the original table on the average amount of amino acids per 100 gm. food appears in Table 43 (p. 160), including the eight "essential amino acids" which are necessary for maintenance of body tissue plus arginine and histidine, which have been found to be important for growth.

TABLE 17
MAINTENANCE DIET* FOR A PHENYLKETONURIC CHILD
AGED TWELVE MONTHS (12)

FEEDING	QUANTITY	LOFENALAC MEASURES§	CALORIES†		PROTEIN†		PHENYL-ALANINE‡	
			Food	Lofenalac	Food† (Gm.)	Lofenalac (Gm.)	Food‡ (Mg.)	Lofenalac (Mg.)
<i>Breakfast:</i>								
orange juice.....	½ cup	1	32	43	0.4	1.42	20	8
puréed fruit.....	½ cup	2	38	86	0.2	2.84	10	16
cereal||.....	½ cup	2	34	86	1.0	2.84	50	16
<i>Mid-morning feeding:</i>								
water, 7-Up, or lemon juice plus water....	½ cup	2	4	86	0.1	2.84	5	16
<i>Noon feeding:</i>								
puréed fruit.....	½ cup	2	77	86	0.4	2.84	20	16
puréed yellow vegetable.....	½ cup	2	20	86	0.5	2.84	25	16
<i>Mid-afternoon feeding:</i>								
prepared gelatin.....	1 tbsp.	1	40	43	1.0	1.42	50	8
plus water.....	½ cup							
whipped cream.....	1 tbsp.	1	52	43	0.3	1.42	15	8
<i>Evening feeding:</i>								
puréed green vegetable	½ cup	2	9	86	0.6	2.84	30	16
puréed fruit.....	½ cup	2	77	86	0.4	2.84	20	16
<i>Bedtime feeding:</i>								
fruit juice.....	½ cup	1	64	43	0.1	1.42	5	8
Vitamin supplement.....	0.6 cc.							
Total.....		18	447	774	5.0	25.66	250	144

* The food and Lofenalac supply quantities of vitamins and minerals which meet the Recommended Dietary Allowances (Table 3) for a child of this age, with the exception of riboflavin. A daily dosage of Zymadrops provide additional nutrients, including 1 mg. riboflavin.

† Mean values for calories and protein were calculated from food tables (19) for fruit and vegetable exchanges commonly consumed by children of this age.

‡ The phenylalanine content of foods was estimated to approximate 5 per cent of total protein (11). Lofenalac contains approximately 8 mg. phenylalanine per measure.

§ One measure of powder weighs 9.45 gm.

|| For preparation of the cereal, the Lofenalac may be mixed with water to supply a liquid for moistening, or fruit juice may be used instead of the fruit. In substituting other grain products for the cereal, the low-phenylalanine commercial powder may be added to 1 tsp. kosher margarine, honey, jelly, or apple butter once daily. Gluten-low products contain restricted amounts of protein; thus the quantities used for cereal substitutions may be adjusted accordingly.

PROTEIN FRACTIONS: GLIADIN RESTRICTION

Various fractions of protein have long been of interest in connection with allergic manifestations. As a result, certain foods have been eliminated, the most common being eggs, milk, and various grain products. This has posed a problem in constructing acceptable recipes for breads, desserts, sauces, etc., in which the offending products are avoided. Recipes have been collected and tested for this purpose by committees of the Diet Therapy Section of The American Dietetic Association and are now compiled and available in the booklet entitled *Allergy Recipes* (1957).

More recently the gliadin, or glutamine-bound fraction of protein in wheat, rye, oats, and barley, has become of particular interest in the treatment of certain malabsorption syndromes (14-17). In this case, in which wheat, rye, oats, and barley are omitted, other grains and cereal products must be substituted, leaving corn flour, corn-meal, potato flour, rice flour, soybean flour, wheat-starch flour ("gliadin-free") as the alternates.

The wheat-rye-oat-free diet has been described by Sleisenger, Rynbergen, Pert, and Almy (18). Several recipes are included for corn muffins, corn pone, rice-flour bread, rice-flour muffins, rice-flour sponge cake, and rice-flour brownies. Additional recipes may be found in a new booklet by Margaret Abowd, *Low Gluten Diet with Recipes* (Ann Arbor: University Hospital, University of Michigan, 1958).

For additional information on the protein fractions in some of the principal proteins of common foodstuffs, reference may be made to W. H. Peterson and F. M. Strong, *General Biochemistry* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1953), Table 5-2, page 108.

REFERENCES

1. BROCK, J. F. Survey of world situation on kwashiorkor, *Ann. New York Acad. Sc.*, **57**:696-713, 1954.
2. HOLT, L. E., JR. Nutrition in infancy and adolescence. *In* Modern nutrition in health and disease, ed. M. G. WOHL and R. S. GOODHART, chap. xxxiv. Philadelphia: Lea & Febiger, 1955.
3. ALBANESE, A. A. Protein and amino acid requirements of infants, *Pediatrics*, **8**:455-62, 1951.
4. REYNOLDS, M. S. Amino acid requirements of adults, *J. Am. Dietet. A.*, **33**:1015-18, 1957.

5. ROSE, W. C. The amino acid requirements of adult man, *Nutrition Abstr. & Rev.*, **27**:631-47, 1957.
6. ROSE, W. C., WIXOM, R. L., LOCKHART, H. B., and LAMBERT, G. F. The amino acid requirements of man, *J. Biol. Chem.*, **217**:987-95, 1955.
7. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. Report of the FAO Committee on Protein Requirements. Rome, 1957.
8. HORWITT, M. K. Niacin-tryptophan requirements of man, *J. Am. Dietet. A.*, **34**:914-19, 1958.
9. WRIGHT, W. W. Phenylketonuria, *J.A.M.A.*, **165**:2079-83, 1957.
10. ZELLWEGER, H. U. Enzyme deficiency diseases. II. Phenylketonuria, *J. Am. Dietet. A.*, **34**:1045-50, 1958.
11. ARMSTRONG, M. D., and TYLER, F. H. Studies on phenylketonuria. I. Restricted phenylalanine intake in phenylketonuria, *J. Clin. Invest.*, **34**:565-85, 1955.
12. KARLE, I. P., O'DONNELL, M. M., and EHMKE, D. A. Enzyme deficiency diseases. IIa. A phenylalanine-restricted diet, *J. Am. Dietet. A.*, **34**:1051-52, 1958.
13. ORR, M. L., and WATT, B. K. Amino acid content of foods. ("Home Economic Research Reports," No. 4.) Washington: U.S. Department of Agriculture, 1957.
14. ADLERSBERG, D. Problems of management of idiopathic sprue, *New York State J. Med.*, **55**:3575-82, 1955.
15. DICKE, W. K., WEIJERS, H. A., and VAN DE KAMER, J. H. Coeliac disease. 2. The presence in wheat of a factor having a deleterious effect in cases of coeliac disease, *Acta paediat.*, **42**:34-42, 1953.
16. VAN DE KAMER, J. H., WEIJERS, H. A., and DICKE, W. K. Coeliac disease. 4. An investigation into the injurious constituents of wheat in connection with their action on patients with coeliac disease, *Acta paediat.*, **42**:223-31, 1953.
17. VAN DE KAMER, J. H., and WEIJERS, H. A. Coeliac disease. 5. Some experiments on the cause of the harmful effect of wheat gliadin, *Acta paediat.*, **44**:465-69, 1955.
18. SLEISINGER, M. H., RYNBERGEN, H. J., PERT, J. H., and ALMY, T. P. A wheat-rye-and-oat-free diet, *J. Am. Dietet. A.*, **33**:1137-40, 1957.
19. BOWES, A. DE P., and CHURCH, C. F. Food values of portions commonly used. 7th ed. Philadelphia: A. de P. Bowes, 1951.

For the purpose of working toward the standardization of values on food composition in the dietary management of diabetes, the American Diabetes Association in 1947 invited The American Dietetic Association to select a committee to work jointly with its Committee on Education. Since the work of the Diabetes Section of the U.S. Public Health Service is so intimately concerned with these matters, it joined in this project to become the third co-operating organization. The objectives of this joint committee were to prepare a set of representative values suitable for use in dietary calculation and to develop a simplified method for planning the diet, including several "exchange lists" of foods of similar food value.

The joint committee was faced with many difficulties due in part to a lack of uniformity in the composition of food occurring as a result of varietal differences, variations in conditions of growth, degree of maturity, and methods of harvesting, storage, or preparation. For example, two different types of peaches may vary as much as 125 per cent in carbohydrate content. The composition of a piece of well-done meat will be roughly 25 per cent higher in protein than a piece which is rare, owing to a difference in water content. The carbohydrate content of bread will fluctuate, depending upon its age

1. Report of the Committee on Diabetic Diet Calculations, The American Dietetic Association. Prepared co-operatively with the Committee on Education, American Diabetes Association, and the Diabetes Section, U.S. Public Health Service. Compiled by Elizabeth K. Caso.

and the way it has been stored (1). McCance and Widdowson (2) have pointed out that an appreciable amount of carbohydrate may be lost in the cooking of vegetables. American food tables (3, 4) report "total carbohydrate" values which are considered to contain a varying percentage of unavailable carbohydrate (5). All these factors had to be considered carefully and weighted in preparing figures for calculating diabetic diets.

On the other hand, there is a great variation from day to day in bodily requirements and utilization of food which is dependent on such factors as activity, emotional status, and insulin dosage. In fact, differences in bodily needs far exceed differences in food composition and therefore minimize the problem of the inevitable variation in food content. Thus nothing more than reasonable detail is justifiable in calculating diabetic diets. As a result, foods have been grouped in terms of similarity in composition.

FOOD EXCHANGE LISTS

Recognizing these facts, the joint committee has submitted the food values given in Table 18. As mentioned above, the list is

TABLE 18
FOOD VALUES FOR CALCULATING DIABETIC DIETS

Group	Amount	Weight (Gm.)	Carbo- hydrate (Gm.)	Protein (Gm.)	Fat (Gm.)	Energy (Calories)
Milk, whole.....	$\frac{1}{2}$ pt.	240	12	8	10	170
Vegetable, group A....	As desired	.....	.....	.....	.....	.....
Vegetable, group B....	$\frac{1}{2}$ cup	100	7	2	.....	36
Fruit.....	Varies	.....	10	.....	.....	40
Bread exchanges.....	Varies	.....	15	2	.....	68
Meat exchanges.....	1 oz.	30	.....	7	5	73
Fat exchanges.....	1 teaspoon	5	.....	.....	5	45

greatly abbreviated by combining foods of similar composition into food exchange lists.

Milk.—In rounded figures, the composition of 1 cup (8 oz.) of whole fresh milk averages 12 gm. carbohydrate, 8 gm. protein, and 10 gm. fat (4). One cup or $\frac{1}{2}$ pt. is purposely used as the unit of measurement, since milk in most sections of this country is purchased by the quart. Thus $\frac{1}{2}$ pt. is relatively easy for the patient to

measure, and any multiple of $\frac{1}{2}$ pt. can be figured into the meal plan for the day. This is much simpler than prescribing odd amounts, such as 7 or 14 oz. per day.

Several forms of cow's milk are available, such as evaporated, dried, or skim milk. These types of milk have been combined into one table called "List 1—Milk Exchanges" (Table 19). In the amounts listed, one may be substituted for another, since they are all approximately equal in composition.

Problems of measuring carbohydrate.—Innumerable lists have been prepared which classify vegetables according to the amount of carbohydrate they contain. In some instances, vegetables have been

TABLE 19
LIST 1—MILK EXCHANGES
(Per Serving: Carbohydrate, 12 Gm.; Protein, 8 Gm.; Fat, 10 Gm.)

Type of Milk	Approximate Measure	Weight (Gm.)
Whole milk (plain or homogenized)...	1 cup (8 oz.)	240
Skim milk*.....	1 cup	240
Evaporated milk.....	$\frac{1}{2}$ cup	120
Powdered whole milk.....	$\frac{1}{4}$ cup	35
Powdered skim milk (nonfat dried milk)*.....	$\frac{1}{4}$ cup	35
Buttermilk (from whole milk).....	1 cup	240
Buttermilk (from skim milk)*.....	1 cup	240

* Since these forms of milk contain no fat, two fat exchanges may be added to the diet when they are used.

divided into lists containing approximately 3, 6, 9, and 12 per cent carbohydrate. In others, they have been grouped as 5, 10, or 15 per cent vegetables. One author might place a vegetable in the 6 per cent group while another might include it in the 3 per cent list. There has been little uniformity in this matter. In addition, the percentage classification has been difficult for the patient to comprehend and to put into practical use.

In seeking some simpler manner of grouping the vegetables, the committee took into account the controversy regarding "total" and "available" carbohydrate. According to the Department of Agriculture (3), "'total' carbohydrate in the majority of cases is reckoned as carbohydrate by difference, that is, as the difference between 100 per cent and the sum of the percentages of water,

protein, fat, and ash. This measure includes starch, dextrin, and sugars, and is to this extent an approximate measure of the total carbohydrate that can be utilized by the body. However, it tends to over-estimate the available carbohydrate since it also includes crude fiber and organic acids, when present, and any undetermined solids." The American Diabetes Association, upon the recommendation of W. H. Olmsted, has defined available carbohydrate as follows (5): "This term includes starch, dextrin, glycogen, glucose, fructose, galactose, sucrose, lactose, and maltose. It represents the portion of the carbohydrate of foods available to the human body for glycogen formation." That organization feels that available carbohydrate is the preferred value for computing diabetic diets.

There is evidence to show that cellulose, hemicellulose, and gums are broken down by bacterial action in the human intestinal tract to form volatile fatty acids (5, 6) which do enter into glycogen formation. However, isotopic studies of the intermediary metabolism of volatile fatty acids (7-10) seem to indicate that they do not cause a *net* increase in the body's supply of glycogen.

The organic acids, chiefly malic and citric, are converted to glucose. In each case, two molecules of citrate or malate form one of glucose. Altogether, the total amount of glucose formed from organic acids is variable. Some workers believe that it is negligible. More studies in this field are needed (5).

These studies of the availability of fractions making up "total-carbohydrate-by-difference" are very complex. Bernice K. Watt, of the Bureau of Human Nutrition and Home Economics, Department of Agriculture, feels that it may be a long time before the ideal in food analysis is reached, with not only quantitative data but data on human utilization available for the separate components of the so-called "carbohydrate-by-difference."

The question then arises as to the advisability of using values for starch and sugar alone as the measure of the carbohydrate content of vegetables and fruits. Dr. Watt has stated, after reviewing data in the bureau files, that, for a fair number of fruits, the analyses for sugar and starch appear to be as representative of the product as were estimates of total carbohydrate. For some fruits and many vegetables this is not the case, since products selected for study of sugar or starch content were not always ordinary products but were

often selected for study because of some particular characteristic or condition of growth. The Department of Agriculture is currently accumulating considerable data on the carbohydrate fractions of foods.

Furthermore, McCance and Widdowson (2) report a loss of carbohydrate in the cooking process. Although the analyses were done on English foods and have not been, to any extent, carried out on American foods, at least the findings are significant and would tend to justify the use of lower values for carbohydrate content.

This whole problem resolves itself into the need for some practical basis to use for the calculation of carbohydrate in diabetic diets. After some consideration, the joint committee finally recommended the figures for starch and sugar as representative of available carbohydrate, even though they may be short of the ideal.

Classification of vegetables.—In Table 20 are summarized the data used to arrive at a simplified grouping of the more commonly used vegetables.

The first group of vegetables (group A) contains 3 gm. or less of carbohydrate per 100-gm. serving. Therefore, the committee recommends that these vegetables be grouped in one list (Table 21) and that the negligible amount of carbohydrate which they contain need not be figured in the diet unless more than 200 gm. is used at a meal.

The second group of vegetables in Table 20 contains more carbohydrate. Some of them are more popular than others. Therefore, a weighted average was taken (Table 22), and, based on these data, the committee decided to figure the composition of these vegetables as 7 gm. carbohydrate and 2 gm. protein per 100-gm. serving.

Although the list of group B vegetables is short, it contains some of the more popular vegetables. However, it is not likely that more than one of these vegetables would be eaten in one day. The dietitian who has previously figured three or more vegetables in the diet may now find that she needs to calculate only one group B vegetable and allow the patient other vegetables from group A as desired.

The remainder of the vegetables in Table 20 contains appreciably more carbohydrate. For simplicity they are included in the list of bread exchanges and will be considered later. None of the other lists represents as major a change as this new classification of vegetables (Table 21).

TABLE 20

CARBOHYDRATE CONTENT OF VEGETABLES PER 100-GM. SERVING

Food	SOURCE OF REFERENCE		
	U.S. Dept. of Agriculture (3) (Sugar and Starch) (Gm/100 Gm)	McCance and Widdowson (2) (Gm/100 Gm)	Williams <i>et al.</i> (11) (Gm/100 Gm)
List 2, Group A—Vegetable Exchanges			
Asparagus.....	1.7	1.1	.....
Beans, string, young...	2.6	2.9	5.8
Beet greens.....	0.5	.....	.....
Broccoli.....	1.9	0.4 (tops)	1.1
Brussels sprouts.....	.....	1.7	2.6
Cabbage.....	3.5	3.0	2.5
Cauliflower.....	2.6	1.2	1.0
Celery.....	1.2	1.3	.....
Chard.....	0.8	.....	.....
Chicory.....	0.2	.....	.....
Cucumber.....	2.6	1.8	.....
Dandelion greens.....	0.9	.....	.....
Eggplant.....	.....	3.1	.....
Kale.....	1.4	.....	.....
Lettuce.....	1.6	1.8	1.4
Mushrooms.....	0	0	.....
Mustard greens.....	0.4	0.9	.....
Radishes.....	3.4	2.8	.....
Spinach.....	0.3	1.4	0.7
Squash, summer.....	1.2	.....	.....
Tomatoes.....	3.4	2.8	1.6
List 2, Group B—Vegetable Exchanges			
Beets.....	9.6 (total CHO)	9.9	7.3
Carrots.....	7.5	5.4	6.0
Onions.....	7.2	5.2	.....
Peas, greens.....	9.0	10.6	8.3
Pumpkin.....	5.1	3.4	.....
Rutabaga.....	6.7	.....	.....
Squash, winter.....	4.9	.....	.....
Turnip.....	4.6	3.8	3.5
List 4—Bread Exchanges			
Beans, baked.....	18.8	17.3	.....
Beans, dried.....	62.1 (total CHO)	.....	.....
Beans, Lima.....	23.5	.....	.....
Corn.....	18.9	.....	14.8
Parsnips.....	11.9	11.3	.....
Peas, dried.....	45.1	50.0 (raw) 19.1 (cooked)	.....
Potato, white.....	15.6	18.3	16.4
Potato, sweet.....	25.6	20.1	23.7

TABLE 21

LIST 2—VEGETABLE EXCHANGES

Group A

Negligible Carbohydrate, Protein, and Calories if 1 Cup
(200 Gm.) or Less Is Used

Asparagus	Eggplant	Lettuce
Beans, string, young	Greens*	Mushrooms
Broccoli*	Beet	Okra
Brussels sprouts	Chard, Swiss*	Pepper*
Cabbage	Collard	Radish
Cauliflower	Dandelion	Sauerkraut
Celery	Kale	Squash, summer
Chicory*	Mustard	Tomatoes*
Cucumbers	Spinach	Watercress*
Escarole*	Turnip	

Group B

Per Serving: Carbohydrate, 7 Gm.; Protein, 2 Gm.
(1 Serving = $\frac{1}{2}$ Cup = 100 Gm.)

Beets	Peas, green	Squash, winter*
Carrots*	Pumpkin*	Turnip
Onions	Rutabaga	

* These vegetables have high vitamin A value. At least one serving should be included in the diet each day.

TABLE 22

DATA USED TO CALCULATE THE COMPOSITION
OF VEGETABLES, GROUP B

Food	Carbohydrate Content (Starch and Sugar)* (Gm/100 Gm)	Weighting (Based on Usual Rate of Consump- tion)†
Beets.....	8.0	3
Carrots.....	7.5	4
Onions.....	7.2	1
Peas, green (medium)....	9.0	4
Pumpkin.....	5.1	.....
Rutabaga.....	6.7	$\frac{1}{2}$
Squash, winter.....	4.9	2
Turnip.....	4.6	1

* U.S. Department of Agriculture figures (3).

† From *Family Food Consumption in the United States, Spring, 1942* (18) and *Consumption of Food in the United States, 1909-48* (12).

Fruit.—The carbohydrate content of fruit differs with the variety as in vegetables, and fruits have been classified into groups according to their carbohydrate content. To avoid the confusion of having several groups and to simplify dietary instruction for the patient, the practice in the past few years (13, 14) has been to list all fruits together in *amounts* that would supply either 10 or 15 gm. carbohydrate. The committee working on the material was in favor of the list (Table 23) which contained 10 gm. carbohydrate, since it presented the majority of the more common fruits in serving sizes that are easy to purchase, economical to serve, and relatively satisfying in amount. The carbohydrate values of the fruits are based on the starch and sugar analyses of the Department of Agriculture (3). For practicality the figures were rounded.

In Table 24 the fruits have been listed in household measurements. Since each fruit in the amount listed contains approximately 10 gm. carbohydrate, one may be exchanged for the other. There is some variation between measured and weighed portions of fruit. Every so-called "small" apple will not weigh exactly 80 gm. Here again, however, the variation seems reasonable on the basis of the difference in actual carbohydrate content of each food.

Bread, cereals, and vegetables of high carbohydrate content.—Again, it was obvious that if many foods of high carbohydrate content could be included in the one list of bread exchanges, it would be much easier for all those concerned with the planning of diabetic diets. Many lists of this sort have been prepared by other groups. The joint committee agreed upon the list given in Table 25, which includes several types of breadstuffs, a number of cereals, different varieties of crackers, and the vegetables with the highest carbohydrate content, as shown in Table 20.

Although the average slice of bread may weigh 25 gm. and contain approximately 13 gm. carbohydrate, it was decided that it would be preferable to list all the foods in this group in amounts that contain approximately 15 gm. carbohydrate. A $\frac{1}{2}$ -cup serving of many of these foods, which is an easy quantity to measure, yields this amount of carbohydrate. During the course of a day, an individual who is allowed six bread exchanges, for example, is likely to select several different foods from List 4, such as potato, cereal, or crackers. The average typical day's consumption of bread exchanges is therefore approximately 15 gm. carbohydrate per serving.

TABLE 23
AMOUNT OF FRUIT SUPPLYING
10 GM. CARBOHYDRATE

Food	SOURCE OF REFERENCE	
	U.S. Dept. of Agricul- ture (3) (Gm.)	Joint Com- mittee's Recom- menda- tions (Gm.)
Apple.....	97	80
Applesauce.....	126	100
Apricots, fresh.....	96	100
Apricots, dried.....	22	20
Banana.....	52	50
Blackberries.....	164	150
Blueberries.....	103	100
Cantaloupe.....	238	200
Cherries.....	75	75
Dates.....	16	15
Figs, fresh.....	62	50
Figs, dried.....	18	15
Grape juice.....	60	60
Grapefruit.....	154	125
Grapefruit juice.....	118	100
Grapes.....	67-87	75
Honeydew melon.....	143	150
Mango.....	73	70
Orange.....	113	100
Orange juice.....	111	100
Papaya.....	111	100
Peach.....	114	100
Pear.....	112	100
Pineapple.....	84	80
Pineapple juice.....	83	80
Plums.....	120	100
Prunes, dried.....	24	25
Raisins.....	16	15
Raspberries.....	139	150
Strawberries.....	189	150
Tangerines.....	115	100
Watermelon.....	167	175

TABLE 24

LIST 3—FRUIT EXCHANGES*
(Carbohydrate—10 Gm. per Serving)

Food	Approximate Measure
Apple (2-in. diameter)	1
Applesauce	$\frac{1}{2}$ cup
Apricots	
Fresh	2 medium
Dried	4 halves
Banana	$\frac{1}{2}$ small
Blackberries	1 cup
Blueberries	$\frac{2}{3}$ cup
Cantaloupe (6-in. diameter)†	$\frac{1}{4}$
Cherries	10 large
Dates	2
Figs, fresh	2 large
Figs, dried	2
Grape juice	$\frac{1}{4}$ cup
Grapefruit†	$\frac{1}{2}$ small
Grapefruit juice†	$\frac{1}{2}$ cup
Grapes	12
Honeydew melon (7-in. diameter)	$\frac{1}{8}$
Mango	$\frac{1}{2}$ small
Orange†	1 small
Orange juice†	$\frac{1}{2}$ cup
Papaya	$\frac{1}{3}$ medium
Peach	1 medium
Pear	1 small
Pineapple	$\frac{1}{2}$ cup
Pineapple juice	$\frac{1}{3}$ cup
Plums	2 medium
Prunes, dried	2 medium
Raisins	2 tablespoons
Raspberries	1 cup
Strawberries†	1 cup
Tangerine	1 large
Watermelon	1 cup

* Unsweetened canned fruits may be used in the same amount as listed for the fresh fruit.

† These fruits are rich sources of ascorbic acid. At least one serving should be included in the diet each day.

TABLE 25

LIST 4—BREAD EXCHANGES
(Per Serving: Carbohydrate, 15 Gm.; Protein, 2 Gm.)

Food	Approximate Measure	Weight (Gm.)
<i>Bread:</i>		
1 slice		25
biscuit, roll (2-in. diameter)	1	35
muffin (2-in. diameter)	1	35
cornbread (1½-in. cube)	1	35
Flour	2½ tablespoons	30
<i>Cereal:</i>		
cooked	½ cup	100
dry (flake and puffed)	¾ cup	20
rice and grits, cooked	½ cup	100
Spaghetti and noodles, cooked	½ cup	100
<i>Crackers:</i>		
graham (2½-in. square)	2	20
oysterettes	20 (½ cup)	20
saltines (2-in. square)	5	20
soda (2½-in. square)	3	20
round, thin (1½-in. diameter)	6-8	20
<i>Vegetables:</i>		
beans and peas, dried, cooked	½ cup	100
(Lima, navy, split pea, cowpeas)		
beans, Lima, fresh	½ cup	100
beans, baked, no pork	¼ cup	50
corn, sweet	⅓ cup	80
corn, popped	1 cup	20
parsnips	⅔ cup	125
potatoes, white—baked or boiled (2-in. diameter)	1	100
potatoes, white—mashed	½ cup	100
potatoes, sweet or yams	¼ cup	60
Sponge cake, plain (1½-in. cube)	1	25
Ice cream (omit 2 fat exchanges)	½ cup	70

Meat, fish, poultry, eggs, and cheese.—The foods which are high in protein have been listed in amounts that are equal in protein and fat content to approximately 1 oz. meat. It was noted that the method or preparation or the cut of the meat (rib or rump) will influence the protein and fat content. Also, some forms of cheese are higher in fat than others as a result of the type of milk (whole or skim) used in their preparation. Some varieties of fish (cod versus mackerel) con-

TABLE 26
LIST 5—MEAT EXCHANGES
(Per Serving: Protein, 7 Gm.; Fat, 5 Gm.)

Food	Approximate Measure	Weight (Gm.)
Meat and poultry, medium fat (beef, lamb, pork, liver, chicken)	1 oz.	30
Cold cuts (4½ in. square, ½ in. thick) . . .	1 slice	45
Frankfurter (8 or 9 per lb.)	1	50
<i>Fish:</i>		
cod, mackerel	1 oz.	30
salmon, tuna, crab	¼ cup	30
oysters, shrimp, clams	5 small	45
sardines	3 medium	30
<i>Cheese:</i>		
Cheddar or American	1 oz.	30
cottage	¼ cup	45
Eggs	1	50
Peanut butter*	2 tablespoons	30

* Limit use or adjust carbohydrate (deduct 5 gm. carbohydrate per serving when used in excess of one exchange).

tain more fat than others. In a mixed diet, these differences become minimized. After reviewing the dietary analyses of these foods, the committee recommended the list of meat exchanges given in Table 26 and the figures of 7 gm. protein and 5 gm. fat per unit of exchange.

Diets which include odd amounts of meat, such as 75 or 105 gm., are difficult to measure. Servings of 1, 2, or 3 oz., for example, are more practical for the patient, since the food is usually purchased in these amounts. This factor was taken into consideration in preparing this list.

Fats.—The problem of arriving at a figure for the composition of

fats was relatively simple, since there are fewer variable factors involved. The joint committee accepted the value of 5 gm. fat per fat exchange. The list (Table 27) contains foods that are approximately equal in fat content.

These six exchange lists (Tables 19, 21, 24, 25, 26, and 27) will allow the patient great variety in his diet and permit him to select foods from the different groups that may suit his income and food habits. The lists should also help to establish some uniformity in dietary instruction and counteract a practice that has no scientific basis, that of excluding various foods, such as potato, certain fruits, and some other foods, from the diet.

TABLE 27
LIST 6—FAT EXCHANGES
(Fat—5 Gm. per Serving)

Food	Approximate Measure	Weight (Gm.)
Butter or margarine.....	1 teaspoon	5
Bacon, crisp.....	1 slice	10
<i>Cream:</i>		
light, 20%.....	2 tablespoons	30
heavy, 40%.....	1 tablespoon	15
Cream cheese.....	1 tablespoon	15
French dressing.....	1 tablespoon	15
Mayonnaise.....	1 teaspoon	5
Oil or cooking fat.....	1 teaspoon	5
Nuts.....	6 small	10
Olives.....	5 small	50
Avocado (4-in. diameter).....	$\frac{1}{8}$	25

Special considerations.—The following foods contain negligible amounts of carbohydrate, protein, and fat and may therefore be used as desired in the diet:

Coffee	Rhubarb
Tea	Mustard
Clear broth	Pickles, sour
Bouillon	Pickles, dill—unsweetened
Gelatin, unsweetened	Saccharin
Rennet tablets	Pepper
Cranberries	Spices
Lemon	Vinegar

“Specialty” foods for diabetic patients are not recommended. They are expensive, the information on the package is often misleading, and the patient can usually eat all the natural foods (breads, cereals, unsweetened fruits, vegetables) in the amount specified in his diet outline.

CALCULATION OF THE DIABETIC DIET

By using the short list of food values given in Table 18, it will be possible to calculate diet prescriptions with considerable ease and simplicity, taking into account the amount of each of these food groups which the patient should eat. This simplicity in calculating a diet will result in the saving of time for both the physician and the dietitian. The patient will also benefit immeasurably by a diet that is made to suit his food habits. Variety in the diet will be achieved by using the food exchange lists (Tables 19, 21, 24, 25, 26, and 27).

The nutritive adequacy of the diet will be assured by including the same *basic foods* that are recommended for the normal individual. These include the following:

Milk.....	1 pt. for adults; 1 qt. for children
Meat, fish, poultry, eggs, and cheese. . .	4-5 oz.
Whole-grain or enriched cereal or bread. .	To meet caloric needs
Fruit—one a citrus fruit or tomato	2 servings
Vegetables—one green or yellow	2 servings
Fat or oil.....	To meet caloric needs

The actual calculation of the diet can be reduced to a simple formula, as shown in the tabulation on p. 84. To determine the number of servings of bread, meat, and fat exchanges required to complete the diet prescription, it is necessary only to:

a) Subtract the number of grams of carbohydrate (61 in the example in the table) furnished by the other sources of carbohydrate from the amount prescribed (180) and divide the result by 15, the number of grams of carbohydrate in one serving of bread exchange, as noted in List 4.

b) Adjust the amount of protein in the diet to the prescription by subtracting the number of grams of protein (34 in the example) supplied by milk, vegetables, and bread exchanges from the amount prescribed (80) and dividing the remainder by 7, the amount of protein in each meat exchange.

c) Follow the same procedure with regard to fat, except to divide the result by 5, the number of grams of fat in one serving, as noted in List 6.

The diet is figured to coincide as closely as possible with the prescription. However, it is not practical to split bread or meat exchanges into halves or to add extra fruits and vegetables if the patient does not care for larger amounts. Therefore, the carbohydrate may vary as much as 7 gm. from the amount ordered, and the protein may differ by 3 gm. The fat will agree closely with the prescription, since the figures for fat are all in multiples of 5.

PROCEDURE FOR CALCULATING A DIABETIC DIET (15)

Sample Prescription

Carbohydrate.....	180 gm.
Protein.....	80 gm.
Fat.....	70 gm.
Calories.....	1,700

	Amount	Carbo- hydrate (Gm.)	Pro- tein (Gm.)	Fat (Gm.)
Milk, whole (List 1).....	1 pt.	24	16	20
Vegetables (List 2, Group A).....	As desired	...	..	..
Vegetables (List 2, Group B).....	1 serving	7	2	..
Fruit (List 3).....	3 servings	30	..	..
Total carbohydrate from sources other than bread exchanges.....		61		
180 gm. carbohydrate in prescription — 61 gm. from sources other than bread ex- changes ————— 119 ÷ 15 = 8 bread exchanges				
Bread exchanges (List 4).....	8 servings	120	16	
Total protein from sources other than meat ex- changes.....		...	34	
80 gm. protein in prescription — 34 gm. from sources other than meat ex- changes ————— 46 gm. ÷ 7 = 7 meat exchanges				
Meat exchanges (List 5).....	7 servings		49	35
Total fat from sources other than fat exchanges .....		...	..	55
70 gm. fat in prescription — 55 gm. from sources other than fat ex- changes ————— 15 gm. ÷ 5 = 3 fat exchanges				
Fat exchanges (List 6).....	3 servings			15
		181	83	70

DIVISION OF FOOD INTO MEALS

Division of the total amount of food prescribed into meals should be worked out with the patient. In doing this, several factors must be considered:

- a) Present meal patterns, which are usually related to such factors as occupation, working hours, and place of eating.
- b) Diabetic condition, i.e., tendency to excrete more or less sugar at varying times during the day.
- c) Type of insulin—regular, protamine zinc, globin, or Lente.

The carbohydrate content of the diet should be divided between the meals, avoiding too large a proportion of the total at any one meal. When protamine insulin is used, nourishment at bedtime (perhaps one-seventh of the day's allowance of carbohydrate) should be recommended. When globin insulin is used, also give an afternoon lunch (approximately one-seventh) and reduce the carbohydrate of the breakfast to about the same amount.

A good source of protein should be included at each meal (milk, eggs, meat, fish, or cheese). The fat is apt to divide itself naturally with fairly even distribution throughout the meals.

SAMPLE MEAL PLANS

The simplified method of calculating a diabetic diet just described is recommended, since it is the procedure most likely to make certain that the diet is adjusted to the food preferences of the individual. "Diet lists" prepared in advance can be used for convenience, provided that they are modified to suit the special needs of the individual. For this reason nine sample meal plans (Tables 28 and 29) were prepared by the committee to fit various needs.

Each of these nine diets has been outlined and illustrated with sample menus in small leaflets which may be distributed to patients. It is expected that these will be used in conjunction with the booklet *Meal Planning with Exchange Lists* which has also been prepared for the use of patients. In addition, two other leaflets for patients have been prepared in one of which appropriate changes in the exchange lists have been made to fit the need for modifications in sodium content. The other leaflet indicates adaptations of the exchange lists to fit those who may need to use bland-flavored foods.

For the physician, a special leaflet has been prepared, containing

the carbohydrate, protein, fat, and caloric content of each food exchange, tables of prescriptions for various levels of dietary intake, desirable weights for men and women, and notes regarding the selection of diet prescriptions for adults and children.

TABLE 28
CALORIC LEVELS OF SAMPLE MEALS FOR DIABETICS

Meal Plan	Carbo- hydrate (Gm.)	Protein (Gm.)	Fat (Gm.)	Energy (Calories)
1.....	125	60	50	1,200
2.....	150	70	70	1,500
3.....	180	80	80	1,800
4.....	220	90	100	2,200
5*.....	180	80	80	1,800
6*.....	250	100	130	2,600
7*.....	370	140	165	3,500
8.....	250	115	130	2,600
9.....	300	120	145	3,000

* Planned particularly for children.

TABLE 29
SAMPLE MEAL PLANS FOR DIABETICS

Diet	Milk	Veg. A	Veg. B	Fruits	Bread Exchange	Meat Exchange	Fat Exchange
1.....	1 pt.	As desired	1	3	4	5	1
2.....	1 pt.	As desired	1	3	6	6	4
3.....	1 pt.	As desired	1	3	8	7	5
4.....	1 pt.	As desired	1	4	10	8	8
5*.....	1 qt.	As desired	1	3	6	5	3
6*.....	1 qt.	As desired	1	4	10	7	11
7*.....	1 qt.	As desired	1	6	17	10	15
8.....	1 pt.	As desired	1	4	12	10	12
9.....	1 pt.	As desired	1	4	15	10	15

* These diets contain more milk and are especially suitable for children.

The twelve leaflets and the *Meal Planning with Exchange Lists* are available from The American Dietetic Association, 620 North Michigan Avenue, Chicago 11, Illinois.

USE OF THE EXCHANGE LISTS

Because the figures for use in calculating diets for the patient with diabetes have been recommended by all three of the co-operating

agencies (16), the material is receiving widespread interest, and increased and more widespread use. The Diabetes Section of the U.S. Public Health Service also has available a series of colored filmstrips with sound recording suitable for use in the group teaching of professional and lay people. The series on nutrition includes a practical presentation of the food exchange lists. These filmstrips have been prepared in co-operation with The American Dietetic Association and the American Diabetes Association.

Nutritional evaluation.—An appraisal of the various nutrient, mineral, and vitamin contents of the diet may be made simply by comparison with the normal dietary plans. As previously stated, an evaluation of the vitamin A and the carotene content of various diets has been made by a committee of the Diet Therapy Section (17). It was found that low-caloric and low-fat diets frequently served to diabetics contained between 91 and 2,600 I.U. of vitamin A when liver was not served once a week. These same diets were high in carotene, however, owing to the large amount of fruits and vegetables present. These facts become of importance where there is a dysfunction in the assimilation and metabolism of carotene, as frequently occurs in diabetes and liver damage. In these cases it will be desirable to use liver one or more times per week or to add vitamin A supplements.

REFERENCES

1. Calculation of diabetic diets, *J. Am. Dietet. A.*, **24**:218-19, 1948.
2. McCANCE, R. A., and WIDDOWSON, E. M. Chemical composition of foods. 2d ed. Brooklyn, N.Y.: Chemical Publishing Co., 1947.
3. CHATFIELD, C., and ADAMS, G. Proximate composition of American food materials. (U.S. Department of Agriculture Circular No. 549.) 1940.
4. BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS in co-operation with the NATIONAL RESEARCH COUNCIL. Tables of food composition in terms of eleven nutrients. ("U.S. Department of Agriculture Miscellaneous Publications," No. 572.) 1945.
5. OLMSTED, W. H. The available carbohydrate of fruits and vegetables, *Proc. Am. Diabetes A.*, **9**:385-406, 1950.
6. HUMMEL, F. C., SHEPHERD, M. L., and MACY, I. G. Disappearance of cellulose and hemicellulose from the digestive tracts of children, *J. Nutrition*, **25**:59-70, 1943.
7. BUCHANAN, J. M., and HASTINGS, A. B. The use of isotopically marked carbon in the study of intermediary metabolism, *Physiol. Rev.*, **26**:120-55, 1946.
8. BLOCH, K. The metabolism of acetic acid in animal tissues, *Physiol. Rev.*, **27**:574-620, 1947.

9. WOOD, H. G. The fixation of carbon dioxide and the inter-relationships of the tricarboxylic acid cycle, *Physiol. Rev.*, **26**:198-246, 1946.
10. STADIE, W. C. The intermediary metabolism of fatty acids, *Physiol. Rev.*, **25**:395-441, 1945.
11. WILLIAMS, R. D., WICKS, L., BIERMAN, H. R., and OLMSTED, W. H. Carbohydrate values of fruits and vegetables, *J. Nutrition*, **19**:593-604, 1940.
12. BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS. Consumption of food in the United States, 1909-48. ("U.S. Department of Agriculture Miscellaneous Publications," No. 691.) 1949.
13. STERN, F. *Applied dietetics*. 3d ed. Baltimore: Williams & Wilkins Co., 1949.
14. TURNER, D. *Handbook of diet therapy*. 1st ed. Chicago: University of Chicago Press, 1946.
15. CASO, E. K., and STARE, F. J. Simplified method for calculating diabetic diets, *J.A.M.A.*, **133**:169-71, 1947.
16. Revised tables of food values, *Proc. Am. Diabetes A.*, **9**:403-6, 1950.
17. JOHNSON, D. Vitamin A versus carotene content of low-fat diets in obesity, cholecystitis, and liver disease, *J. Am. Dietet. A.*, **25**:873-74, 1942.
18. BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS. Family food consumption in the United States, spring, 1942. ("U.S. Department of Agriculture Miscellaneous Publications," No. 550.) 1944.

Chapter 9 *The Sodium-restricted Diet*

The sodium-restricted diet is an allowance of food and drink in which the sodium content is restricted to a prescribed level. Other nutrients remain as nearly as possible on a level satisfactory for nutritive efficiency.

The person on an unrestricted diet may consume ordinarily between 5 and 10 gm. or more sodium daily, as a result of sodium products added in commercial processing, in preparation in the kitchen, and at the table. In addition, Bills (2) has pointed out:

Many manufactured food products which are not intentionally salted contain somewhat more sodium than the natural foods from which they are prepared. The source of this sodium is found in the numerous special uses of sodium compounds in the food industry. Sodium chloride is employed for many purposes besides seasoning, preserving, pickling, and koshering. As brine it is used (a) in the flotation process of sorting green peas from hardened peas and heavy extraneous matter, (b) for preventing enzymic discoloring of freshly sliced apples and pears which are to be canned, (c) as a heat transfer and blanching agent in freezing foods, and (d) for regenerating base-exchange water softeners (the sodium appears in the softened water as bicarbonate, and water thus treated is used in canning to prevent toughening of vegetables).

Sodium alginate is employed as a stabilizer for ice cream and chocolate milk drinks. Sodium aluminum sulphate is the alum of baking powders. Sodium benzoate is used as a preservative in fruit juice concentrates, confectionery, margarine, and so on. Sodium bicarbonate is the gas source in baking powders and self-rising flours. It is also used with cocoa in the "Dutching" process, for tenderizing vegetables, and for neutralizing. Sodium carbonate is used for Dutching, neutralizing, and water softening. It has a special use in removing hop resins from brewers' yeast in the debittering process. Sodium citrate is used as a stabilizing agent in evaporated milk and jellies. Sodium glutamate is an important flavoring adjunct. Sodium hydroxide is used for Dutching cocoa, neutralizing corn syrup, debittering ripe olives, and hulling corn in the old lye

process of hominy manufacture. It is also widely used in peeling apricots, peaches, grapefruit segments, carrots, and sweet potatoes, for canning, and for dipping fruits prior to drying. Sodium acid phosphate is used as an acidulating agent. The secondary phosphate is used for emulsifying process cheese, for stabilizing evaporated milk, and as the quickening agent in quick-cooking farina. Sodium acid sulphite is employed for sulphuring fruits prior to drying. These few examples may serve to explain the almost ubiquitous occurrence in processed foods of sodium in amounts greater than are present in the corresponding natural products.

Medications and in some cases drinking water may also constitute important sources of sodium.

NUTRIENT CONTENT

Since the level of sodium prescribed for therapy may vary from 200 mg. daily to 2,000 mg. or more, depending upon the needs of the individual patient, it becomes desirable to have a basic plan in which protein, mineral, and vitamin needs may be at a level for nutritive sufficiency but from which modifications may be made to suit the level of sodium prescribed. For this reason, the appropriate plans of normal diet described in the section on normal diet are recommended as the basic pattern of diet. For example, if the patient is an adult, the appropriate basic pattern (Table 2) may be used for making modifications. If the patient is a pregnant woman, the respective plan of diet (p. 26) should be used. In the case of an adolescent or a child, normal patterns of diet (Tables 6 and 7) should be used as a basis for the sodium modifications. In planning a 500-mg. sodium diet for an adult, for example, the kind and amount of the food groups described in Table 30 might be used.

FOOD PREPARATION

Meat, poultry, and fish may be enhanced in flavor by using fruit combinations. Cranberry sauce with poultry, applesauce with pork, mint jelly with lamb, and lemon with fish are standbys. For those who like meat or fish cooked in tomato sauce, unsalted canned tomato, juice or purée, may be combined with garlic, onion, green pepper, and mushrooms and flavored with such herbs as oregano if desired. Meat and fish may be simmered or baked in this sauce. Wines, low-sodium French-type dressings (see salad dressing below), lemon, and vinegar provide excellent marination for meat.

TABLE 30

500-MG. SODIUM DIET FOR AN ADULT

(80 Gm. Protein; 1,545 Calories; Derived from Normal Diet, Table 2)

Daily Food Plan*	Sodium (Mg.)	Protein (Gm.)	Calories
MILK GROUP†			
1 pt. whole.....	244	17	330
MEAT AND EGG GROUP			
1 egg.....	70	6	75
4 oz. cooked meat, poultry, or fish (edible portion), no added sodium.....	104	28	300
VEGETABLE AND FRUIT GROUP			
6 servings (no sodium added)			
Dark-green or yellow vegetable (1 serving).....	9	2	30
Other vegetable (2 servings).....	8	2	50
Citrus fruit or other fruit rich in vitamin C (1 serving).....	1	1	40
Other fruit (2 servings).....	5	1	80
BREAD-CEREAL-POTATO-LEGUME GROUP			
8 servings (no added sodium).....	60	21	640
FATS AND SWEETS			
Without this group, the calories will be approximately 1,545‡.....	.....	.....	.....
Total.....	501	78	1,545

* For additional values on sodium content of foods see Tables 44, 45, and 46 (pp. 177-88).

† During pregnancy, adolescence, and childhood, 1 quart of milk should be used, thus increasing the sodium from milk to 488 mg. The use of skim milk will reduce the calories by approximately half; protein and sodium remain the same.

‡ For substitutions or additions to suit caloric needs see Table 30A. For a sample menu pattern and sample meals see Table 30B.

Modification for 250-mg. sodium diet.—The use of a specially processed low-sodium milk may reduce the sodium content of milk by approximately 90 per cent. A palatable product is the fluid milk that has been passed through an ion-exchange resin, resulting in the replacement of sodium with an equivalent amount of potassium. This change alone will reduce the diet to about 250 mg. sodium.

Modification for 1,000-mg. sodium diet.—Substitution of 2 slices *ordinary salted* bread, for the bread to which no sodium has been added, with 2 teaspoons *ordinary salted* butter or margarine will add approximately 500 mg. sodium to the above diet, making the total a 1,000-mg. sodium diet. If omissions, reductions, or changes are made in any other of the food groups, a reassessment of the nutrient content should be made by reference to the values in the normal diet (p. 7).

Modification for 2,000-2,500-mg. sodium diet.—If the *eight servings of the bread group* were from *ordinary salted bread*, approximately 1,500 mg. sodium would be added, making the diet 2,000 mg. sodium. If 8 *teaspoons ordinary salted butter* or *margarine* were used with the bread, 400 more mg. sodium would be added, making the total sodium approximately 2,400 mg. Alternates, sample menu patterns, and sample meals appear in Tables 30A and 30B.

TABLE 30A

DAILY FOOD PLAN OF DIET CONTAINING 500 MG. SODIUM
(80 Gm. Protein; 1,545 Calories; Derived from Table 30)

Daily Food Plan	Description
MILK GROUP	
1 pt.	One pint of whole milk contains approximately 17 gm. protein, 330 calories, and 244 <i>mg. sodium</i> . It is also an important source of minerals and vitamins of the B complex. One pint skim milk may contain approximately 165 calories and similar protein and sodium to whole milk. Palatable milks prepared by an ion-exchange process are available in some areas. Sodium is reduced by 90 per cent; thiamine, niacin, and vitamin B ₁₂ by about 50 per cent; and calcium and vitamin B ₆ by about 75 per cent. Potassium may be increased to about twice ordinary milk.
MEAT AND EGG GROUP	
1 egg	One egg will contain approximately 70 <i>mg. sodium</i> , 7 gm. protein, and 75 calories.
4 oz. cooked meat, poultry, or fish	One ounce (edible portion) of cooked beef, veal, lamb, pork, poultry, or fish (no sodium added) contains about 25 <i>mg. sodium</i> , 7 gm. protein, and 75 calories. Meat, poultry, or fish salted at any stage of processing will not be suitable for use; therefore, ordinary canned or smoked and seasoned meat and cheese should be omitted. All products must be specially canned or prepared without added sodium, to be suitable for this diet. Four ounces meat contain approximately 104 <i>mg. sodium</i> .
VEGETABLE AND FRUIT GROUP	
6 servings	A dark-green or yellow vegetable is important each day for vitamin A value. This group includes asparagus, green beans, peppers, yellow squash, pumpkin. Each serving may be estimated at 9 <i>mg. sodium</i> . Carrots, kale, beet greens, chard, and spinach have been excluded. One-half cup squash and pumpkin may contain 35 calories. Others are negligible.
A dark-green or yellow vegetable is important daily for vitamin A value	Other vegetables to which no sodium has been added may be used, such as cauliflower, cucumber, eggplant, onion, radishes, summer squash, and tomatoes. Each serving will contain about 4 <i>mg. sodium</i> . Calories are negligible. Beets, celery, and white turnips have been excluded.

TABLE 30A—*Continued*

Daily Food Plan	Description
VEGETABLE AND FRUIT GROUP— <i>Continued</i> 6 servings— <i>Continued</i>	
A citrus fruit or other fruit rich in vitamin C daily	One orange or $\frac{1}{2}$ grapefruit or 1 large tangerine or $\frac{1}{2}$ cup citrus juice is considered one serving of citrus fruit. One cup strawberries, or 1 cup red raspberries or $\frac{1}{4}$ cantaloupe is a satisfactory substitute. Sodium content of fruit is approximately 1 mg. per serving and 40 calories per serving.
BREAD-CEREAL-POTATO- LEGUME GROUP (no added sodium) 8 servings	One slice of bread or substitute (no sodium added) contains about 70 calories and 9 mg. sodium or less; i.e., $\frac{1}{2}$ cup cooked potato, rice, dried beans, cornmeal, noodles, spaghetti, corn, or $\frac{1}{4}$ cup sweet potato will contain less than 5 mg. sodium. The cooked cereals, such as farina, rolled oats, rolled wheat cereal, and wheat meals, are low in sodium (avoid "quick-cooking" cereals to which a sodium salt has been added). The prepared cereals to which no sodium has been added are Puffed Rice, Puffed Wheat, and Shredded Wheat. Avoid other prepared cereals with sodium added.
FATS AND SWEETS	<p><i>Without this group</i> the calories in the diet approximate 1,545. If 1 teaspoon sugar, jelly, or honey is included, approximately 20 calories are added. No sodium need be estimated for this.</p> <p>If 1 teaspoon fat or oil is included, approximately 45 calories are added. Oils are not ordinarily salted. Bacon, ham fat, salt pork, sausage fat, margarine, and butter will have considerable amounts of sodium. Two teaspoons ordinary, salted butter or margarine contain about 100 mg. sodium. Unsalted butter and margarine to which no sodium has been added will be a negligible source of sodium.</p>
SALT SUBSTITUTES	Salt substitutes should be used only upon recommendation of a physician.
IODINE	A source of iodine may become necessary, since iodized salt cannot be used.
WATER	Drinking water may be an important source of sodium (see Table 46, p. 184).

TABLE 30B

500-MG. SODIUM DIET—MENU PATTERN AND SAMPLE MEALS FOR AN ADULT
(80 Gm. Protein; 1,545 Calories; Derived from Table 30A)

DAILY FOOD PLAN*	SAMPLE MENU PATTERN†	SAMPLE MEALS‡
	A.M.	
MILK GROUP 1 pt.	1 citrus fruit or $\frac{1}{2}$ cup juice 1 egg $\frac{1}{2}$ cup low-sodium cooked cereal or $\frac{3}{4}$ cup flake-type*	Sliced tangerine 1 egg Oatmeal with milk and sugar†
MEAT AND EGG GROUP 1 egg and 4 oz. (edible portion) meat, poultry, or fish No added sodium	1 slice low-sodium, enriched, or whole-grain bread or toast Spread† Coffee or tea if desired Sugar	Toast with spread† Coffee Sugar
	Noon	
VEGETABLE AND FRUIT GROUP 6 servings A dark-green or deep-yellow vegetable daily Citrus fruit or other fruit rich in vitamin C daily No added sodium	2 oz. (edible portion) meat, poultry, or fish 3 servings of the bread-potato- cereal group* Fresh or cooked vegetable Fruit 1 glass milk Tea or coffee if desired	Club sandwich: Sliced chicken Sliced tomato Lettuce Spread† Tossed salad with special dressing‡ Fresh mixed fruits Milk
BREAD-CEREAL-POTATO GROUP 8 servings No added sodium	P.M.	
FATS AND SWEETS† No added sodium (Without this group the diet contains 1,545 calories)	2 oz. (edible portion) meat, poultry, or fish 2 servings from potato-bread- cereal group* Dark-green or deep-yellow vegetable Other vegetable Fruit 1 portion from bread group* Milk	Roast pork Sweet potato Frozen green beans Chinese cabbage with special dressing§ Spiced peaches† Hot roll (no added sodium) Spread† Milk

* See Table 30A for alternates or substitutes in each food group.

† If 1 teaspoon fat or oil is included in addition to the basic diet of 1,545 calories, 45 calories per teaspoon should be added. This may be used on bread or in cooking.

If 1 teaspoon sugar, jelly, or honey is included in addition to the basic diet, approximately 20 calories should be added. These may be added in amounts suitable to meet caloric needs of individual patients.

‡ For discussion of food preparation see pp. 56-61.

§ For French-type salad dressing with no added sodium see p. 95.

Some additional flavor combinations are as follows:

Beef—dry mustard, marjoram, nutmeg, onion, sage, thyme, pepper, bay leaf, grape jelly
Lamb—mint, garlic, rosemary, curry, broiled pineapple rings
Veal—bay leaf, ginger, marjoram, curry, currant jelly, spiced apricots
Chicken—paprika, mushroom, thyme, sage, parsley, cranberry sauce
Fish—dry mustard, paprika, curry, bay leaf, lemon juice, mushrooms, and sherry
Eggs—pepper, green pepper, mushrooms, dry mustard, paprika, curry, jelly, or pineapple omelet

Vegetables may be flavored with a sweet-sour sauce (diluted vinegar and sugar, seasoned with grated onion, spices, and herbs as desired) or with hot low-sodium salad dressing made as follows: canned tomato, tomato juice, or purée (no sodium added) may be flavored with lemon or vinegar, sugar, grated horse-radish root, onion, garlic, spices, and herbs as desired. Calories will be negligible. Other possible flavor combinations are as follows:

Asparagus—lemon juice
Beans, green—marjoram, lemon juice, nutmeg, dill seed
Broccoli—lemon juice
Cabbage—mustard dressing, dill seed, unsalted butter with lemon and sugar
Cauliflower—nutmeg
Corn—green pepper, tomatoes
Peas—mint, mushroom, parsley, onion
Potatoes—parsley, unsalted butter, mace, chopped green pepper, chives, onion
Squash—ginger, mace
Sweet potatoes—candied or glazed with cinnamon or nutmeg or scalloped with apples
Tomatoes—basil, oregano

Vegetable aspics may be concocted with plain gelatin, tomato juice (no sodium added), and lemon, grated cabbage, cucumber, and green pepper. Low-sodium dressing or mayonnaise with no added sodium may be used. Vegetables canned without added sodium are available. Frozen lima beans or peas may have sodium added. Labels should be carefully read, and information sought from commercial firms.

Baked goods pose a special problem because the ordinary products contain not only salt but soda and baking powder, which are also high in sodium. Low-sodium products may be prepared, however, from combinations of foods permitted on the diet. Unsalted fats and oils are available. Leavening may be obtained from yeasts or sodium-

free baking powder. The following formula may be prepared by a pharmacist:

Potassium bicarbonate—39.8 gm.
 Cornstarch—28.0 gm.
 Tartaric acid—7.5 gm.
 Potassium bitartrate—56.1 gm.

Low-sodium bread is usually available from bakeries in the larger cities. If not, it must be made at home. Special crackers, cookies, and cake are sold. In all cases it is important to read the labels for the number of milligrams of sodium contained.

Low-sodium milk is available. In many parts of the country a palatable product has been obtained by passing fluid milk through an ion-exchange resin at 35°–40° F. The result is the replacement of sodium with an equivalent amount of potassium. The taste and flavor of the milk are only slightly affected. However, this product contains only about 50 per cent of the thiamine, niacin, and vitamin B₁₂ of the original milk and about 75 per cent of the calcium and vitamin B₆. The potassium is doubled but is still within the normal physiologic intake for adults of 3–5 gm. The Council on Foods and Nutrition of the American Medical Association (3) recommends the following levels per quart:

Sodium, less than	50	mg.
Potassium, less than	2.5	mg.
Thiamine, at least	0.15	mg.
Riboflavin, at least	1.0	mg.
Niacin, at least	0.4	mg.
Vitamin B ₆ , at least	300	μg.
Vitamin B ₁₂ , at least	3	μg.

Dried, low-sodium milk products are also available.

SUPPLEMENTARY MATERIALS

Numerous special cookbooks have been prepared for patients on low-sodium diets. However, the value of any recipe depends upon an accurate estimate of the sodium content per serving and the proper substitution within each individual diet. This usually requires guidance from a dietitian, nutritionist, or physician. A critical review of low-sodium cookbooks, booklets, and materials on meal planning has been prepared at the request of the Nutrition Com-

mittee, American Heart Association, and published in the *Journal of The American Dietetic Association* (1957) (5).

More recently, three booklets (4) for patients have been prepared by a Subcommittee on Sodium Restricted Diets, American Heart Association. Reasons understandable to the lay person are given as to the "Whys and Wherefores of a Sodium Restricted Diet"; descriptions of diet plans limited in sodium and calories are presented; and questions regarding food preparation are answered. The Nutrition Committee of the American Heart Association has limited the plans to 500-mg., 1,000-mg., and 2,400-4,500-mg. sodium diets, since it was felt that prescriptions between these levels are unnecessary for therapeutic purposes. These three booklets are available from the American Heart Association, 44 East Twenty-third Street, New York 10, New York, to physicians, dietitians, nutritionists, and nurses.

For professional persons, the publication entitled *Sodium Restricted Diets: The Rationale, Complications, and Practical Aspects of Their Use* ("Food and Nutrition Board-National Research Council Publications," No. 325 [1954]) provides an excellent reference on the normal physiology of sodium metabolism, the use of sodium-restricted diets in congestive cardiac failure, hypertension, renal disease, cirrhosis of the liver, toxemias of pregnancy, Ménière's disease, and hormone therapy, as well as contraindications for the use of low-sodium diets and salt substitutes. Of particular value to nutritionists and dietitians is the extensive compilation of the sodium and potassium content of foods and the sodium content of public water supplies, arranged by states. A short table entitled "Estimated Best Values" has been reproduced from this publication and appears in Appendix VII as Table 44. Additional tables on the sodium content of foods by Bills *et al.* (2) and by Peterson, Skinner, and Strong (1) appear in Appendix VII, in Tables 45 and 46 (pp. 179-86). Since sodium is closely related to other extra- and intracellular ions, particularly potassium, a guide to the potassium content of foods has also been included in Tables 45 and 46.

REFERENCES

1. PETERSON, W. H., SKINNER, J. T., and STRONG, F. M. *Elements of food biochemistry*, pp. 262-65. New York: Prentice-Hall, Inc., 1953.

2. BILLS, C. E., McDONALD, F. G., NIEDERMEIER, W., and SCHWARTZ, M. C. Sodium and potassium in foods and water, *J. Am. Dietet. A.*, **25**:304-14, 1949.
3. COUNCIL ON FOODS AND NUTRITION. Low sodium milk, *J.A.M.A.*, **163**:739, 1957.
4. HEAP, B., and ROBINSON, C. New diet booklets for cardiac patients and sodium restriction, *J. Am. Dietet. A.*, **34**:277-79, 1958.
5. REIMER, A., JOHNSON, D., and ROBINSON, C. Sodium restricted diets, *J. Am. Dietet. A.*, **33**:104-7, 1957.

The low-purine diet is a food allowance in which sources of purines, such as glandular organs, dried legumes and lentils, and meat extractives, are eliminated, and other meat and fish are restricted to 4 oz. weekly, thus reducing the daily intake of uric acid, equivalent to approximately 35 mg. If a high-carbohydrate, low-fat regimen is imposed in addition, as has been suggested by Bartels (1), further modifications may be made, as outlined in the discussion of the low-fat diet (p. 56).

The following discussion of the purine content of foods and the outline for the low-purine diet is taken from a report of a committee of the Diet Therapy Section of The American Dietetic Association (2):

A review of the available literature regarding the purine content . . . of foods revealed a distressing paucity of usable figures and consistent values. The committee felt itself incompetent to evaluate the data inasmuch as the sources used and methods of analyses could not be satisfactorily compared.

In an attempt to obtain the most recent figures available, aid was solicited from outstanding authorities throughout the United States. It was found that none were using purine calculations or could add to the common list of references, or would attempt to evaluate comparatively the tables given in current texts.

An outline has been prepared by this committee as a guide for practical use in planning a low-purine diet. When protein-rich foods have been omitted because of their relatively high purine content, increases have been made in milk, eggs, and cheese to maintain normal protein levels.

BREAKFAST

Fruit—citrus fruit or tomato juice

Cereal (except oatmeal), with cream or milk and sugar

Eggs—2

Toast (whole-grain or enriched white), with butter or enriched margarine. Jelly, jam, honey, or marmalade if desired

Beverages—decaffeinated coffee or cereal coffee with cream and sugar

LUNCH AND DINNER

Soup—milk soups made with any vegetables except those forbidden (see special instructions below)

Meat, fish, or fowl—only 2-oz. portion twice weekly, omitting glandular meats entirely; 2-oz. portion of cheese daily on days meat is not served

Vegetables—potato daily if desired; 2-4 additional vegetables (any except those on forbidden list)

Bread—whole-grain or enriched, with butter or enriched margarine

Dessert—fruit, puddings, cake, ice cream, gelatin desserts, or pie

Beverage—milk or buttermilk and decaffeinated coffee or cereal coffee

SPECIAL INSTRUCTIONS

1. Avoid liver, sweetbreads, brains, and kidney. A 2-oz. portion of any other meat, fish, or fowl may be served twice weekly.
2. Serve cheese and eggs as meat substitutes. Fish roe and caviar may be used as desired.
3. Use 1-2 pt. of milk daily in order to meet the protein need.
4. Omit all meat extracts, broth soups, and gravies.
5. Eliminate the following vegetables entirely from the diet: dried beans, lentils, dried peas, spinach.
6. Avoid coffee, tea, chocolate, and cocoa. Use decaffeinated coffee or a cereal coffee if desired. (There is some question as to whether or not caffeine can be converted into uric acid in the body.)
7. Omit alcoholic beverages of all kinds.
8. Allow fruits of all kinds—fresh, canned, and dried.
9. Allow cereals of all kinds except oatmeal.
10. Serve sugar as desired with amounts adjusted to caloric needs. Cream and butter may be restricted when a low-caloric allowance is needed or when a low-fat regimen is desired.

TABLE 31

PURINE CONTENT OF FOODS PER 100 GM.

Group I (0-15 Mg.)	Group II (50-150 Mg.)	Group III (150-800 Mg.)
Vegetables	Meats	Sweetbreads
Fruits	Fish	Anchovies
Milk	Sea food	Sardines
Cheese	Beans, dry	Liver
Eggs	Peas, dry	Kidney
Cereals	Lentils	Meat extracts
	Spinach	

EVALUATION OF A LOW-PURINE DIET

DAILY FOOD INTAKE	QUANTITY		MINERALS		VITAMINS					FOODSTUFFS			CAL- ORIES*
	Weight (Gm.)	Approximate Measure	Ca (Gm.)	Fe (Mg.)	A (I.U.)	Ascorbic Acid (Mg.)	Thia- mine (Mg.)	Ribo- flavin (Mg.)	Niacin EQUIVA- lent (Mg.)	Carbo- hydrate (Gm.)	Pro- tein (Gm.)	Fat (Gm.)	
Milk, whole†	976	1 qt.	1.16	0.8	1,560	10	0.36	1.68	9.2	48	34	38	660
Eggs	108	2 medium	0.06	2.6	1,100	.....	0.10	0.28	3.5	Trace	12	12	150
Cheese, Cheddar-type..	75	2½ oz.	0.54	0.8	1,050	.....	0.02	0.31	3.9	2	19	24	300
Bread, whole-grain or enriched white.....	150	5 slices	0.13	3.0	.....	.....	0.40	0.24	5.6	75	13	5	400
Cereal, whole-grain or enriched.....	20	½ cup	0.03	0.6	.....	.....	0.08	0.04	0.8	15	3	1	80
Potato, cooked.....	150	1 medium	0.02	1.1	30	21	0.14	0.05	1.3	29	3	.....	130
Vegetable, green or yel- low‡	100	½ cup	0.09	1.3	6,280	30§	0.08	0.15	1.3	5	2	.....	30
Vegetable, other||	100	½ cup	0.03	0.5	225	15§	0.05	0.05	0.5	5	1	.....	25
Fruit, citrus.....	100	1 serving#	0.02	0.2	110	45	0.05	0.02	0.2	10	1	.....	40
Fruit, other.....	.....	1 serving#	0.02	0.5	955	18	0.04	0.05	0.5	10	1	.....	40
Sugar, jelly, or honey..	20	.....	.....	0.1	.....	1	.....	.....	.....	16	.....	.....	60
Butter or fortified mar- garine.....	20	4 level tea- spoons	.....	.....	660	.....	.....	.....	.....	.....	.....	16	145
Total**	.....	.....	2.10	11.5	11,970	140	1.32	2.87	26.8	215	89	96	2,060**

* Calories have been rounded off to nearest 5.

† Milk equivalents may be noted in Table 19.

‡ Asparagus, broccoli, carrots, green beans, kale, yellow squash, pumpkin, turnip greens, and other greens.

§ For canned vegetables, reduce by one-half.

|| Tomato—fresh, canned, or juice; vegetables commonly served raw, as celery, cucumber, lettuce, and cabbage; and other cooked vegetables, as beets, eggplant, onions, rutabagas, and cauliflower.

Portion sizes have been adjusted to provide equivalent carbohydrate and caloric values as in Table 24.

** Minerals, vitamins, and protein will approximate the Recommended Dietary Allowances (see Table 3) for the normal adult. To meet additional caloric needs, further amounts of the above foods may be used, plus other sugars, starches, and fats (Tables 35 and 36).

The approximate content of the above diet is 11 mg. of purine nitrogen or 34 mg. of uric acid. The normal diet plan as outlined in Table 2 contains approximately 132 mg. of purine nitrogen or 265 mg. of uric acid.

Table 31, adapted from Stare and Thorn (3), gives a rough approximation of the purine content of foods. Table 32 contains an enumeration and evaluation of the mineral, vitamin, carbohydrate, protein, and fat content of a low-purine diet. Modifications may be made to meet the needs of individual patients by making adjustments in any of the components of the diet.

REFERENCES

1. BARTELS, E. C. Successful treatment of gout, *Ann. Int. Med.*, 18:21-28, 1943.
2. DUCKLES, D. Purine and cholesterol content of foods, *J. Am. Dietet. A.*, 15:772-74, 1939.
3. STARE, F. J., and THORN, G. W. Protein nutrition in problems of medical interest, *J.A.M.A.*, 127:1120-27, 1945.

KETOGENIC DIETS

A ketogenic diet is one in which the proportion of carbohydrate, protein, and fat is regulated so that the ratio of the ketogenic to the antiketogenic values equals 2 or more or until it is sufficiently high to produce a ketosis (see Glossary).

Ketogenesis.—The production of the “ketone bodies,” i.e., acetone, aceto-acetic acid, and beta-oxybutyric acid, is known as “ketogenesis.” The precursors of the ketone bodies are the fatty acids and certain of the amino acids, e.g., phenylalanine, tyrosine, leucine, and histidine; these are known as “ketogenic substances.” For clinical purposes the ketogenic portion of the diet may be estimated as 90 per cent of the weight of the fat and 50 per cent of the protein.

Antiketogenesis.—Carbohydrate and the amino acids, such as alanine and glycine, which are convertible to glucose in the body, tend to prevent the accumulation of ketone bodies and are said to be “antiketogenic.” Approximately 10 per cent of the weight of the fat in the diet, 50 per cent of the protein, and 100 per cent of the carbohydrate may be estimated as the antiketogenic portion.

When the supply of carbohydrate is inadequate, ketogenesis becomes predominant.

Plan of daily food intake.—If the basic plan of normal diet contains carbohydrate, 150 gm.; protein, 70 gm.; and fat, 70 gm., the ketogenic to antiketogenic ratio is 1:2. In order to reverse this ratio and produce a ketosis, it is necessary to reduce the carbohydrate and change the proportions approximately to carbohydrate, 20 gm.;

TABLE 33

EVALUATION OF A KETOGENIC DIET

(Carbohydrate, 30 Gm.; Protein, 70 Gm.; Fat, 160 Gm.; Calories, 1,815)

DAILY FOOD INTAKE	QUANTITY		MINERALS		VITAMINS					FOODSTUFFS			CAL- ORIES*
	Weight (Gm.)	Approximate Measure	Ca (Gm.)	Fe (Mg.)	A (I.U.)	Ascorbic Acid (Mg.)	Thia- mine (Mg.)	Ribo- flavin (Mg.)	Niacin EQUIVA- lent (Mg.)	Carbo- hydrate (Gm.)	Pro- tein (Gm.)	Fat (Gm.)	
Milk, whole†.....	92	$\frac{3}{8}$ cup	0.10	0.1	5	1	0.03	0.17	0.8	5	3	4	60
Cream, 20 per cent....	90	$\frac{3}{8}$ cup	0.09	.....	750	Trace	0.03	0.13	0.8	4	3	18	185
Eggs.....	108	2 medium	0.06	2.6	1,100	.....	0.10	0.28	3.5	Trace	12	12	150
Meat, poultry, fish, cooked; or cheese†....	180	6 oz. E.P.	0.15§	5.7	9,915	6	0.41	1.11	17.1	.....	44	41	540
Bacon.....	32	4 strips	0.01	1.0	.....	.....	0.16	0.10	1.7	.....	8	17	200
Vegetable, green or yel- low||.....	100	$\frac{1}{4}$ cup	0.09	1.3	6,280	30#	0.08	0.15	1.3	5	2	.....	30
Vegetable, other**....	100	$\frac{1}{4}$ cup	0.03	0.5	225	15#	0.05	0.05	0.5	5	1	.....	25
Fruit, citrus.....	100	1 serving	0.02	0.2	110	45	0.05	0.02	0.2	10	1	.....	40
Fat.....	67	$\frac{1}{4}$ cup	.....	.....	.....	.....	.....	.....	.....	.....	.....	67	585
Total††.....	.....	.....	0.55	11.4	18,385	97	0.91	2.01	25.9	29	74	159	1,815††

* Calories have been rounded off to nearest 5.

† Milk equivalents may be noted in Table 19.

‡ Based on average food consumption data (except liver). If $2\frac{1}{4}$ oz. liver are not used weekly, the vitamin A value and ascorbic acid must be discounted completely.

§ If 4 oz. Cheddar-type cheese are not used during a 10-day period, an additional 100 gm. milk daily will supply equivalent calcium.

|| Asparagus, broccoli, carrots, green beans, kale, yellow squash, pumpkin, spinach, turnip greens, and other greens.

For canned vegetables, reduce by one-half.

** Tomato—fresh, canned, or juice; vegetables commonly served raw, as celery, cucumber, lettuce, and cabbage; and other cooked vegetables, as beets, eggplant, onions, rutabagas, and cauliflower.

†† The levels of calcium, iron, thiamine, and niacin are below the Recommended Dietary Allowances (see Table 3) for the normal adult. Protein and all other vitamins will meet the allowances.

protein, 70 gm.; and fat, 125 gm. When a higher caloric intake is desired, the carbohydrate may be slightly increased. Thus, for a 1,800-calorie diet (Table 33), the distribution could be carbohydrate, 30 gm.; protein, 75 gm.; and fat, 160 gm.

Preparation.—This diet is likely to be unpalatable, expensive, and difficult to follow. Some degree of acceptability may be obtained, however, by the following measures:

Cream of high fat content may be used in ice cream, custards, and other desserts, as well as in salad dressings and soups. Saccharin may be used for sweetening.

The fruits and vegetables used should be those of minimum carbohydrate content and may be served in salads with oil dressings or hot in cream soups. Gelatin sweetened with saccharin may be used for desserts.

Washed-bran wafers may be offered as a bread substitute. Soybean muffins offer a low-carbohydrate bread substitute.

ACIDIC AND BASIC ELEMENTS IN THE DIET

The major mineral elements which are evaluated when an estimate is made of the acid ash residue or the alkaline ash residue of the diet are sodium, potassium, calcium, magnesium, phosphorus, sulfur, and chlorine.

In evaluating the acid ash residue, the inorganic constituents—chlorine, sulfur, and phosphorus, which form acid ions (anions) in the body, viz., chloride, sulfate, and phosphate—are measured as the amount of tenth-normal alkali required for neutralization. In appraising the alkaline ash residue, the inorganic constituents—sodium, potassium, calcium, and magnesium, which form basic ions (cations) in the body—are measured as the amount of tenth-normal acid required for neutralization.

An acid-forming (acidogenic) diet is an allowance of foods having a total anion-forming ash content which is equivalent to 10–20 cc. of tenth-normal acid in excess of the total cation-forming ash, which will be equivalent to 30–35 cc. of tenth-normal alkali when milk, fruits, and vegetables are included, as in the normal diet; proteins, minerals, and vitamins remain at levels necessary for nutritive efficiency (see Glossary).

An alkali-forming (alkalinogenic) diet is an allowance of foods

having a total cation-forming ash content which is equivalent to 20 cc. or more of tenth-normal alkali in excess of the total anion-forming ash, which will be equivalent to 25 cc. or less of tenth-normal acid; proteins, minerals, and vitamins remain at levels necessary for nutritive efficiency.

In general, it can be said that vegetables and fruits are predominantly basic, while cereals, meats, poultry, and fish are predominantly acidic in residue. Most fruits, in spite of their acidity, exert a basic effect on the body, since a number of organic acid radicals, such as citrate and malate, may be oxidized completely to carbon dioxide and water, leaving the salts to contribute to the supply of basic elements in the residue. A few organic acids, however, are not so oxidized, such as benzoic and quinic acids, and hence contribute to the total acidity. Cranberries, plums, and prunes are examples of such fruits. However, exceptions have been found in certain varieties of prunes and plums (1). Foods which exert no acidic or basic effect are refined sugar, butter, lard, oil, cornstarch, and tapioca. Molasses is strongly basic in residue, with an excess of 59.4 cc. of tenth-normal base per 190 gm. Information relating to the excess acid and base values may be found in Table 47, taken from Bridges and Mattice (2).

REFERENCES

1. TURNER, D., and PARSONS, H. Not all plums and prunes acid-forming when used in human diet. *In*: Annual report of the director, 1930-31, p. 121. Madison: Agricultural Experiment Station, University of Wisconsin, 1932. (Bull. 421.)
2. MATTICE, M. R. Bridges' food and beverage analyses, pp. 201-32. 3d ed. rev. Philadelphia: Lea & Febiger, 1950.

SECTION III

INTERVIEWING THE PATIENT

Interviewing

the Patient¹

By Margaret Mead

*Executive Secretary, Committee on Food Habits,
National Research Council, Washington, D.C.*

The modern trend in therapy is to consider the patient as a whole personality in a social setting² and to regard as significant and important every therapeutic contact with the physician, with medical or family caseworker, and with the dietitian. It is realized that, to obtain the best results, specialists must, in addition to performing their special tasks, co-operate in a common therapeutic task—the work and skill of one complementing that of the others. The increased emphasis upon the importance of the patient's whole personality makes new demands upon the dietitian as increased knowledge shows the many ways in which specific food behavior, as well as disease pictures requiring special diets, are themselves concomitants of deep-seated personality distortions and over-emphasis.³

1. This discussion draws upon materials contributed by the large group of members of The American Dietetic Association who co-operated in the project of the Diet Therapy Section on Food and Emotions during 1942-44, which was undertaken in co-operation with the Committee on Food Habits, National Research Council; and the case histories were analyzed by Dr. Margaret Mead, executive secretary of that committee. Received for publication, February 5, 1945. From *Journal of The American Dietetic Association*, Vol. 21, No. 7, July-August, 1945.

2. H. B. Richardson, *Patients Have Families* (New York: Commonwealth Fund, 1944); also G. C. Robinson, *The Patient as a Person* (New York: Commonwealth Fund, 1939).

3. F. Alexander, The influence of psychologic factors upon gastro-intestinal disturbances: a symposium: a report upon research carried on at the University of Chicago Institute for Psychoanalysis. I. General principles, objectives, and preliminary results. Summarized in *Psychosom. Med.*, 1:429, 1939. See also the following: H. Bruch, *Ad-*

Just as at an earlier period in the development of dietetic practice the dietitian learned to understand the extent to which aspects of the patient's behavior in the dietetic interview might be referred to a need for attention, to a desire to show off, or to the gratification of long-denied needs for a relationship with another human being who appeared to take an interest in one's health and fate, now there is a need to integrate into dietetic practice the new findings based upon the work of psychiatrists exploring the new field of psychosomatic medicine. If this integration is to keep pace with the growing discoveries in this field, it must take place not only in the professional schools as new students enter dietetics and in the training for internships of recent graduates but also in the established practice within the hospital and food clinic. In the professional schools young dietitians can profit by instruction from psychiatrists; in the operating clinical situation the new methods can spread best by self-aware teamwork in which the dietitian re-evaluates her current procedures in the light of increasing knowledge of the patient's whole personality and takes it upon herself to communicate to her colleagues—the physician, the psychiatrist, the medical caseworker, and the nurse—just what the possibilities of a dietetic interview are in terms of an all-round therapy designed to meet the needs of the patient as a whole personality who emerges from the hospital to live in a real social situation.

One of the ways in which this increased awareness on the part of the dietitian may be developed is by a consideration of the different roles in which the dietitian sees herself, in which the patient sees her, and in which her professional colleagues in related professions see her. The role of the dietitian is subject to great variation in scope, from that of someone who merely works out a list of foods based

justment to Dietary Changes in Various Somatic Disorders, in the Problem of Changing Food Habits (Committee on Food Habits, National Research Council Bull. 108 [Washington, 1943]), p. 66; H. Bruch and G. Touraine, Obesity in childhood. V. The family frame of obese children, *Psychosom. Med.*, 2:141-206, 1940; H. Bruch, Food and emotional security, in *The Nervous Child*, 3:165. Also M. Mead, Dietary patterns and food habits, *J. Am. Dietet. A.*, 19:1, 1943; L. Rahman, H. B. Richardson, and H. S. Ripley, Anorexia nervosa with psychiatric observations, *Psychosom. Med.*, 1:335, 1939; J. V. Waller, R. M. Kaufman, and F. Deutsch, Anorexia nervosa, a psychosomatic entity, *Psychosom. Med.*, Vol. 2, No. 1, 1940; B. Mittelman, H. G. Wolff, and M. P. Scharf, Emotions and gastroduodenal function: experimental studies on patients with gastritis, duodenitis, and peptic ulcer, *Psychosom. Med.*, 4:5-61, 1942.

upon a physician's prescription and the age and body weight and degree of activity of the patient, through to the concepts of the worker in a food clinic (*a*) as a specialist who can *translate* for the patient-client a *regime* prescribed by the physician into exact amounts and kinds of foods prepared in specific ways; (*b*) as a specialist in the relationship between food and bodily needs who can *guide* the patient-client in making a selection of foods which will produce changes or maintain a given bodily state; (*c*) as a specialist in all the *problems of adjustment* which an individual faces in one facet of his or her existence—the consumption of food, including budgetary problems, conditions of preparation, etc.; and (*d*) as a *member of a team* of therapists—including the physician, psychiatrist, caseworker, public health nurse—in which case the specific type of help and instruction which the dietitian gives must be keyed to the treatment being given by the whole team and oriented not only to the physical needs of the patient-client but to his whole personality.

Each of these roles, or any combination of them, has to be clear to the dietitian and to the patient; and, if the referral from physician or caseworker has not indicated to the patient what role the dietitian plays, it is necessary for her to indicate it herself. This can usually be done best if the dietitian takes a minute to discover what the patient has been led to expect and then elaborates upon and corrects that impression. But a clear definition of why the dietitian is there, what the referring specialist has asked her to do, and what the patient may and may not expect is very important if the dietetic interview is to have its fullest usefulness. Roles *a* and *b* are discussed in the preceding sections. This present section is concerned primarily with roles *c* and *d*.

As growing interest and research amplify the scope of the dietitian's work and bring into it an increasing knowledge of social conditions, of personality dynamics, and of the process of therapy as an interpersonal relationship, it is important that these new emphases should not obscure the dietitian's distinctive role as a specialist in the adjustment between bodily needs and eating habits. It is important that she should include in the interview as many as possible of the insights and procedures which make for a good interview, whether conducted by physician, caseworker, or any other specialist in human relations. But it is also necessary that she do definite and con-

crete teaching about foods, the nature of the particular diet, how it may be calculated, and how the recommended amounts and proportions may be obtained within the framework of the patient's habit patterns. While it is true that, in the past, physicians and caseworkers have underestimated the general therapeutic implications of the dietetic interview and regarded the dietitian as an automatic source of information upon which the patient would inevitably act, it would easily be possible to err in the other direction and demand so much caseworking skill from the dietitian that her necessary and distinctive teaching function would be obscured.

This distinctive character of the dietetic interview imposes definite limitations upon its form. The dietitian must teach concrete, precise material. She must, whenever possible, also convey to the patient some sense of the principles upon which her concrete teaching is based, and in practically every instance she has to persuade the patient to do something which is painful, that is, to attend, from a new point of view, to the details of diet. This is painful because in our society the conscious application of thought—especially of measuring, counting, calculating, estimating—to an aspect of life which is ordinarily associated with gratification of the senses is regarded as reducing pleasure. Reduction in pleasure is likely to be resisted, except by those patients whose peculiar character formation makes them enjoy deprivation, and such patients will present other problems equally difficult to the therapist. However, attempts to make the following of a diet meaningful can be highly successful. The dietitian may expect the patient to feel that her advice is definitely useful if she makes the diet prescription intelligible and easier to follow, makes the goal of loss or gain in weight or a very altered pattern of intake possible of attainment, and makes the diet itself reasonably related to the patient's own bodily state and not an arbitrary set of rules. But the dietitian *cannot* expect to make the following of a diet a pleasure-giving experience, and efforts to clothe the interview in such terms are likely to be disappointing. Many instances have been reported where the patient has developed a tie to the dietitian and improved in health and functioning because someone was taking an interest in him, but this usually means that the dietitian has had to overstep her role and engage in casework for which she may not

have been specially trained and at the expense of giving other patients specific dietary help.

The dietetic interview remains an interview between a specialist-in-food-adjustments and a patient-who-needs-to-learn-something-about-his-diet, and all improvements in procedure must necessarily take this core into account.

EXTENSION OF THE DIETITIAN'S SKILL IN HELPING THE PATIENT ADJUST HIS FOOD HABITS

Recognition of the importance of treating the patient as a whole personality, with a specific cultural background and real life-situation, leads to the inclusion in the dietetic interview of an attempt to get some understanding of the patient's personality, what his reaction is to the diagnosis which has brought him there, what motives may be invoked in teaching new food patterns, and what special resistances have to be overcome. This preliminary exploration of the patient's personality can take place within the framework of the dietetic interview itself and need not wander to wider topics. The more knowledge the dietitian has of the human personality, the better. She needs to be aware of such special problems of childhood as the conflict between dependence upon the mother and the need to be independent, which is likely to express itself strongly in the field of eating, or of the adolescent desire to be like other young people, as illustrated in the following:

EXTRACT FROM AN INTERVIEW WITH A THIRTEEN-YEAR- OLD DIABETIC GIRL

Patient had come in crying, after a two-month absence, and her tests showed sugar.

DIETITIAN: Why K, what seems to be the trouble? You've always had such a nice smile.

PATIENT: Oh, I've been hungry since school started and have eaten more than I should have—even candy sometimes. I just can't help it when all the others can have everything. I *hate* school.

D: What would you like to have to eat? We should be able to get together on this and plan your meals the way you want them.

P: Oh, *could* you? I'd love to have more bread, dessert once in a while, a little gum and candy.

D: Have you ever tried D-Zerta or candy or gum sweetened with saccharin? D-Zerta is a gelatin dessert and can be used in many ways, such as with whipped cream or with fruit. [*D. conferred with doctor.*] If you like, we might increase the

amount of insulin and your food allowance to include another slice of bread and a couple of pieces of candy.

P: Why, that will make my meals practically the same as all the other girls! That's swell!

The patient came in once a month from then on. She was happy, felt well, liked school, and tests were good.

The foregoing illustrates the methods of a dietitian who responded sensitively to the evidences of distress and placed them in context against the patient's previous behavior. She estimated carefully the importance—to an adolescent—of behaving like the other girls and so evaluated correctly the phrase, "I *hate* school," treated the dietary prescriptions as flexible and capable of adjustment to a genuine need on the part of the patient, and succeeded in establishing the patient in an adequate adjustment.

Each age, each sex, has its special problems. For old age it is important to realize that the patient needs to be treated with the respect due to age and experience of life, yet protected, by written advice for instance, from a growing forgetfulness. Thus increased understanding of different regularities of this sort provides a background for a better understanding of personality.

Knowledge of the patient's cultural background—whether from a rural American home; from a foreign-born family's home; from a minority group, which almost inevitably means poor housing and limited household equipment; from a home where religious usages are observed; or from a type of home where no traditional practices may be relied upon, as when mountain people of the South are transplanted to a northern or western area where all the ways of living are unfamiliar—helps the dietitian to make her teaching realistic and relevant. The more she knows of these differences in dietary practice from one socioeconomic group to another and from one nationality background to another, the surer will be her understanding of the patient's questions or probable confusions, misunderstandings, or embarrassments.

A skilled dietitian will also take into account the patient's social situation in terms of status, occupation, income, and living arrangements—making specific allowance for the difficulties of the patient who lives in a cheap club for girls, the bus driver, or the elevator operator; the domestic servant, who is likely to nibble; the underprivileged mother of young children, who is likely to skimp her own

diet to feed them better; the housewife, who must shop on a hand-to-mouth basis or who works and must leave the shopping to a small child; the three-shift household with its irregular meals; and the family in an overcrowded district that has only restricted kitchen privileges. Imaginative inclusion within the dietetic interview of the reality situation of the patient goes a long way toward insuring its success and has high general therapeutic value in increasing the patients' sense that the dietitian is someone who is treating them as they really are—people with ten minutes for lunch, people who have iceboxes but cannot afford to run them, people who are too poor to shop in chain stores where cash must be paid and who depend instead on credit.⁴

A knowledge of current prices, scarcities, and abundances, of current food fads among young people, and of the trend of radio advertising—especially for children—is also important in helping the dietitian to make it seem possible for the patient to follow her instructions easily. While every physician and every nurse should understand the basic principles of nutrition, it devolves upon the dietitian to translate this knowledge into everyday practice in terms of the needs, the intelligence, the emotional attitudes, and the actual situation of each patient.

THE DIETITIAN AS A MEMBER OF A THERAPEUTIC TEAM

The dietitian's functioning in the therapeutic team in hospital or clinic may be considered from three points of view: (1) referral to the dietitian; (2) the dietetic interview or series of interviews; (3) referral from the dietitian, or case report to some other member of the team.

Referral to the dietitian.—At present, referral to the dietitian comes usually from the physician if the need is a medical one and from the caseworker if it is a matter of home management. The physician tends to limit himself to such phrases as "reducing diet," "low-fat diet," "high-caloric diet," "high-vitamin diet," "bland diet," and to omit any information on the patient's personality, capacity to

4. Background materials for the inclusion in dietetic practice of cultural and socio-economic factors may be found among the materials developed at the Boston Dispensary Food Clinic by Frances Stern; at the Community Service Society, New York, by Lucy Gillett; and materials currently issued by the Massachusetts Department of Health and the Committee on Food Habits, National Research Council.

follow directions, the role that the patient's illness plays in the patient's life, etc. Upon the hospital dietitian devolves the task of developing such a working relationship with the physician that, instead of saying, "Stop in and see Miss Jones, the dietitian, and she'll give you your diet," the physician will realize the importance of an interpretative referral and say: "Now Miss X, you will need some help in planning the diet which I have prescribed for you. You'll find that Miss Y, our dietitian who specializes in helping people adjust their meals to their particular health needs, will help you work out the details." With increasingly good working relationships between other therapists and the dietitian, the physician and the caseworker also come to appreciate the importance of giving the dietitian clues about the personality of the patient, namely, summaries of what otherwise would often demand many hours of contact with the patient and experience with the way he responds to different types of suggestions; warnings about ways in which the patient will try to use a relationship; and diagnosis of the role that eating plays in the patient's life—as the only available form of sense gratification, as a reaction to mood, as a method of punishing other people or the self, etc. The interested dietitian can accustom physicians to including such suggestions in their referrals. Thus the dietetic interview will get off to a quick start, the patient will be better oriented in what to expect, and the dietitian already alert to some of the patient's most conspicuous characteristics.

The dietetic interview.—The extent to which the dietetic interview itself becomes an integral part of the treatment of a patient who, in addition to being cured of a specific disease condition or taught to keep the disease under control, is also being adjusted as a whole to a life-situation, depends not only on the dietitian's knowledge of personality but on the knowledge of other members of the therapeutic team concerning the character of dietetic interviews in that particular dietetic department of their own hospital or clinic. Too often physicians, caseworkers, and nurses include in their planning for patients their picture of a dietetic interview, experienced or witnessed twenty years ago, in quite another setting. They may actually seek to prepare the patient for, or seek to adjust subsequent treatment to, a dietetic interview very different from that which the patient actually experiences. This ever present danger can be guarded

against by the dietitian's assuming responsibility for seeing that the other members of the therapeutic team actually know what her practice and that of her staff are, what types of alternatives are recognized in adjusting different kinds of patients to the same general dietary prescription, how much detailed instruction is actually involved, and what sorts of aids, written schedules, models, scales, slides, charts, etc., she uses. Adequate exposure of physicians and caseworkers to the procedure of a dietetic department will result in their raising questions about the possibilities inherent in the situation, which in turn will assist the dietitian in orienting her practice to their premises and deepen her knowledge of the emotional factors with which she has to deal.

Referral from the dietitian and case reports.—As the dietitian works more in a team, the other members of which know what her special skills actually are, both she and they will recognize ways in which material gleaned in the dietetic interview may be used as an indicator of the patient's problems or progress. A series of dietetic interviews is sometimes an excellent device for maintaining contact with a patient, especially if the dietitian is alert to signs of improvement or deterioration, of indications of developing conditions—as when a problem which at first looked like simple malnutrition begins to show signs of anorexia nervosa. Attempts to fit the dietetic interview into an integrated pattern of treatment are an excellent device for focusing more attention upon the whole personality of the patient, thereby making the treatment more effective.

REFERENCES

1. ALDRICH, C. K. Prescribing a diet is not enough, *J. Am. Dietet. A.*, **33**: 785-87, 1957.
2. BABCOCK, CHARLOTTE G. Psychologically significant factors in the nutrition interview, *J. Am. Dietet. A.*, **23**:8-12, 1947.
3. ———. Food and its emotional significance, *ibid.*, **24**:390-93, 1948.
4. ———. Problems in sustaining the nutritional care of the patient, *ibid.*, **28**:222-27, 1952.
5. ———. Comments on human interrelations, *ibid.*, **33**:871-79, 1957.
6. BAYLES, S., and EBAUGH, F. G. Emotional factors in eating and obesity, *J. Am. Dietet. A.*, **26**:430-34, 1950.
7. BERGEVIN, P. Telling vs. teaching—learning by participation, *J. Am. Dietet. A.*, **33**:781-84, 1957.
8. BRENER, R. Dietitian and patient: evaluation of an interpersonal relationship, *J. Am. Dietet. A.*, **28**:515-19, 1952.

9. BRUCH, HILDE. The importance of overweight. New York: W. W. Norton & Co., Inc., 1957.
10. COWING, A. G. Readable writing, *J. Am. Dietet. A.*, **23**:1036-40, 1947.
11. ———. Writing that sells good diet, *ibid.*, **24**:592-94, 1948.
12. DONAHUE, W. T. Psychologic aspects of feeding the aged, *J. Am. Dietet. A.*, **27**:461-66, 1951.
13. ENGLISH, O. SPURGEON. Psychosomatic medicine and dietetics, *J. Am. Dietet. A.*, **27**:721-25, 1951.
14. EPPRIGHT, E. S. Factors influencing food acceptance, *J. Am. Dietet. A.*, **23**:579-87, 1947.
15. FLESCH, R. The art of plain talk. New York: Harper & Bros., 1946.
16. ———. The art of readable writing. New York: Harper & Bros., 1949.
17. GALDSTON, IAGO. Motivation in health education, *J. Am. Dietet. A.*, **25**:745-51, 1949.
18. ———. Nutrition from the psychiatric viewpoint, *ibid.*, **28**:405-9, 1952.
19. GARRETT, ANNETTE. Interviewing: its principles and methods. New York: Family Service Association of America, 1950.
20. GEBHARD, B. Exhibit planning and analysis, *J. Am. Dietet. A.*, **24**:394-98, 1948.
21. HALL, DOROTHY. The dietetic interview as a tool in changing food habits, *J. Am. Dietet. A.*, **22**:999-1002, 1946.
22. HAMBURGER, W. W. The psychology of weight reduction: the initial nutritional interview; the nutritionist-patient relationship; and complications of weight reduction, *J. Am. Dietet. A.*, **34**:17-22, 1958.
23. HOULE, C. O. The dietitian as a teacher of adults, *J. Am. Dietet. A.*, **24**:837-40, 1948.
24. HYMES, J. L. Significance of feeding from the viewpoint of child development, *J. Am. Dietet. A.*, **25**:611-12, 1949.
25. ILG, F. L. The child's idea of what and how to eat, *J. Am. Dietet. A.*, **24**:658-60, 1948.
26. KREITLOW, B. W. Teaching adults democratically, *J. Am. Dietet. A.*, **33**:788-92, 1957.
27. LEACH, J. M. Motivating people to use educational material, *J. Am. Dietet. A.*, **29**:245-47, 1953.
28. MEAD, MARGARET. Cultural patterning of nutritionally relevant behavior *J. Am. Dietet. A.*, **25**:677-80, 1949.
29. MILLER, C. D. Food and food habits in the Hawaiian Islands, *J. Am. Dietet. A.*, **27**:461-66, 1951.
30. MITCHELL, HELEN S., and JOFFE, NATALIE F. Food patterns of some European countries: background for study programs and guidance of relief workers, *J. Am. Dietet. A.*, **24**:676-87, 1944.
31. POSZ, A. C. Do you irritate others when you listen? *J. Am. Dietet. A.*, **34**:730-32, 1958.
32. PRAGOFF, HALE. Areas of cooperation between medical social workers and dietitians, *J. Am. Dietet. A.*, **24**:485-90, 1948.
33. RABINOVITCH, R. D., and FISCHHOFF, J. Feeding in childhood to meet emotional needs: a survey of the psychologic implications of eating, *J. Am. Dietet. A.*, **28**:614-21, 1952.
34. RADKE, MARIAN, and CASO, E. K. Experiments in changing food habits, *J. Am. Dietet. A.*, **23**:403-9, 1947.

35. ———. Lecture and discussion—decision as method of influencing food habits, *ibid.*, 24:23-31, 1948.
36. SPENCER, M. E. An educator talks about motivating people, *J. Am. Dietet. A.*, 25:209-12, 1949.
37. TOWLE, C. Common human needs. ("Public Assistance Reports," No. 8.) Washington: Federal Security Agency, 1945.
38. TRULSON, M., WALSH, E. D., and CASO, E. K. A study of obese patients in a nutrition clinic, *J. Am. Dietet. A.*, 23:941-46, 1947.
39. WALSH, ETHEL. Nutritionists and social workers cooperate on mutual problems, *J. Am. Dietet. A.*, 25:681-83, 1949.
40. WHITE, G. The patient as the focus of attention, *J. Am. Dietet. A.*, 30:25-28, 1954.
41. DEPARTMENT OF PEDIATRICS, UNIVERSITY OF CHICAGO. Liberal infant feeding, *J. Am. Dietet. A.*, 22:622-24, 1946.
42. Motivation in health education. (The 1947 Health Education Conference of the New York Academy of Medicine.) New York: Columbia University Press, 1948.

APPENDIXES

APPENDIX 1

FOOD COMPOSITION TABLE FOR SHORT METHOD OF DIETARY ANALYSIS¹

By Jane M. Leichsenring, Ph.D., and Eva Donelson Wilson, Ph.D.

School of Home Economics, University of Minnesota, St. Paul, and School
of Home Economics, Pennsylvania State College, State College

Since the publication of the revised food composition table for the short method of dietary analysis in 1945 (1), considerable additional information on the nutritive value of foods has appeared in the literature. Furthermore, improved economic status, as well as other factors, has resulted in marked changes in food consumption habits in the United States. Consequently, the food composition table has again been revised to incorporate this newer information.

The values in the food composition table (Table 35) were computed chiefly from the figures compiled by Watt and Merrill (2) in "Agriculture Handbooks," No. 8, *Composition of Foods—Raw, Processed, Prepared*, supplemented by some values from the tables of Bowes and Church (3). Values for cooked foods were used except for those foods customarily eaten raw. The means for the food groups were derived from the values for commonly used foods,

1. 2d rev. Paper No. 2270, Scientific Journal Series, University of Minnesota, Agricultural Experiment Station. Received for publication February 5, 1951.

weighted in accordance with the findings from food consumption studies in the United States for the years 1946-48, inclusive (4). In most instances the values were computed for the size of portions commonly used, as suggested by Bowes and Church. Foods were listed as separate items when they deviated sufficiently in composition from the means of any group to alter significantly the value obtained for any one nutrient. In the interest of brevity, certain foods which are highly seasonal in use or which occur infrequently in American diets were not included.

A significant improvement in the revised food composition table is in the use of physiologic fuel values for proteins, fats, and carbohydrates in place of Atwater's general values of 4-9-4. A brief discussion of the differences between Atwater's average or general values and the physiologic fuel values will make it clear that the former are not suitable for calculating the energy value of individual foods or diets which differ markedly in composition from the average American diet.

Proteins, fats, and carbohydrates from different food sources, when oxidized in a bomb calorimeter, differ appreciably in heat of combustion. For example, the heat of combustion of 1 gm. protein from meat, fish, or milk is 5.65 calories; that of 1 gm. protein from refined cereals is 5.80 calories; and that of 1 gm. protein from vegetables is 5.00 calories. Similarly, fats and carbohydrates from different food sources vary somewhat in heat of combustion when burned in the bomb calorimeter.

Some of the potential energy value of these foodstuffs is lost because of incomplete digestion and absorption. From digestibility studies on a large group of individuals it was found that, on the average, 97 per cent of the protein from animal foods is digested and absorbed, whereas 85 per cent of that from refined cereals and 83 per cent from vegetables are utilized. Thus the available energy from 1 gm. animal protein is 97 per cent of 5.65 calories or 5.50 calories, whereas for vegetable proteins the available energy is only 83 per cent of 5.00 calories or 4.15 calories, a difference of more than 1 calorie per gram of protein.

Differences in the digestibility of fats and carbohydrates from

various food sources likewise alter the energy available from 1 gm. of these substances. Since fats and carbohydrates are completely metabolized by normal individuals, the energy value obtained after deducting the amount lost because of incomplete digestion and absorption constitutes the physiologic fuel value.

The absorbed amino acids, on the other hand, are not completely oxidized in the body, and some of the potential energy is lost in the nitrogenous waste products excreted in the urine. On the average,

TABLE 34
COMPARISON OF THE LONG AND SHORT METHODS OF DIETARY ANALYSIS
(Based on 21 Records for 3 Days)

Nutrient	Unit	Long Method	Short Method	Differences	Mean of Short Method in Percentage of Long Method
Calories.....		1,984	2,004	20	101.0
Protein.....	gm.	65.8	65.1	0.7	98.9
Fat.....	gm.	89.0	88.3	0.7	99.2
Carbohydrate....	gm.	234.8	231.3	3.5	98.5
Calcium.....	gm.	0.94	0.96	0.02	102.1
Phosphorus.....	gm.	1.16	1.16	.....	100.0
Iron.....	mg.	9.47	9.67	0.20	102.1
Vitamin A.....	I.U.	5,800	5,669	131	97.7
Ascorbic acid....	mg.	75.9	74.4	1.5	98.0
Thiamine.....	mg.	1.13	1.12	0.01	99.1
Riboflavin.....	mg.	1.63	1.64	0.01	100.6
Niacin.....	mg.	11.66	11.60	0.06	99.4

this wastage amounts to 1.25 calories per gram of ingested protein. Consequently, in establishing the physiologic fuel value of different proteins, it is necessary to make a further deduction of 1.25 calories. This results in a physiologic fuel value for 1 gm. protein from meat, fish, and milk of 4.25 calories; from refined cereals, of 3.70 calories; and from vegetables, of 2.90 calories. These values show the great differences between the physiologic fuel values of proteins and demonstrate the error inherent in using 4 calories per gram for all proteins when dealing with individual foods or with special diets based on a limited variety of foods. Atwater's general values of 4-9-4 are the means of the physiologic fuel values for the proteins, fats, and carbohydrates comprising the average American diet

TABLE 35

FOOD COMPOSITION TABLE FOR SHORT METHOD OF DIETARY ANALYSIS (2D REVISION)

Food*	Approximate Measure	Weight (Gm.)	Calo- ries	Pro- tein (Gm.)	Fat (Gm.)	Carbo- hy- drate (Gm.)	Cal- cium (Gm.)	Phos- phorus (Gm.)	Iron (Mg.)	Vita- min A (I.U.)	Ascor- bic Acid (Mg.)	Thia- mine (Mg.)	Ribo- flavin (Mg.)	Niacin (Mg.)
<i>Cereal products:</i>														
refined.....	1 slice bread (30 gm.); $\frac{1}{2}$ cup cooked cereal and cereal products (20 gm. dry); $\frac{1}{4}$ -1 cup prep. cereal (20 gm.); 3 soda crackers (20 gm.); 1 $\frac{1}{2}$ cups popcorn (20 gm.); 1 griddle cake (4-in. diameter)	.....	80	2.5	1	15	0.01	0.02	0.2	.....	.....	0.02	0.02	0.3
whole grain and enriched..	1 slice bread (30 gm.); $\frac{1}{2}$ cup cooked cereal (20 gm. dry); $\frac{1}{4}$ -1 cup prepared cereal (20 gm.); 2 Graham crackers (20 gm.)	.....	80	2.5	1	15	.02	.03	0.6	.....	.....	.07	.04	.6
<i>Dairy products:</i>														
butter.....	1 teaspoon	5	35	.....	4	.....	.....	.....	.....	165	.....	.....	.....	.....
cheese, Cheddar type.....	1 cu. in.	30	125	7.5	10	1	.22	.15	0.3	420	.....	.01	.13	.....
cheese, cottage, skim.....	$\frac{1}{2}$ cup	100	95	19.5	1	2	.10	.19	0.3	20	.....	.02	.31	.1
cream, light.....	$\frac{1}{2}$ cup (for heavy cream add $\frac{1}{2}$ serving butter)	30	60	1.0	6	1	.03	.02	.....	250	.....	.01	.04	.....
custard.....	$\frac{1}{2}$ cup	130	150	7.0	7	15	.15	.16	0.6	440	.....	.06	.26	.1
egg.....	1 medium	50	80	6.5	6	.....	.03	.10	1.4	570	.....	.05	.14	.1
ice cream.....	$\frac{1}{2}$ cup	80	165	3.0	10	16	.10	.08	0.1	420	.....	.03	.15	.1
milk:														
buttermilk, skim.....	1 cup	240	85	8.5	.....	12	.30	.23	0.2	.....	2	.10	.43	.2
whole.....	1 cup	240	165	8.5	9	12	.28	.22	0.2	385	2	.10	.41	.2
<i>Desserts:</i>														
cake, plain, chocolate.....	1 piece cake $2\frac{1}{2} \times 2\frac{1}{2} \times 2\frac{1}{2}$ (75 gm.), for iced add 1 serving sweets; 1 waffle, 6 in. diam- eter (60 gm.); 2 $\frac{1}{2}$ doughnuts, cake type (add 1 serving fat)	.....	250	5.0	8	40	.09	.10	0.4	140	.....	.02	.06	.2
cookies, plain.....	2 medium	40	175	2.5	5	30	.01	.03	0.4	100	.....	.02	.02	.2
pie crust.....	$\frac{1}{2}$ shell, single crust	25	110	1.5	6	12	.....	.01	0.4	.....	.....	.05	.04	.5
puddings, cream fillings...	$\frac{1}{2}$ cup	140	150	4.5	5	22	0.14	0.13	0.1	225	.....	0.04	0.22	0.1

* The nutritive value of food mixtures such as macaroni and cheese, Spanish rice, chow mein, creamed vegetables, soups, and so on should be computed on the basis of the kind and approximate amount of the foods in the combination.

Food*	Approximate Measure	Weight (Gm.)	Calo- ries	Pro- tein (Gm.)	Fat (Gm.)	Carbo- hy- drate (Gm.)	Cal- cium (Gm.)	Phos- phorus (Gm.)	Iron (Mg.)	Vita- min A (I.U.)	Ascor- bic Acid (Mg.)	Thia- mine (Mg.)	Ribo- flavin (Mg.)	Niacin (Mg.)
Fats.....	2 slices bacon (20 gm. raw); 1 tablespoon fat (12 gm.); 1 tablespoon mayonnaise (15 gm.); 1½ cu. in. salt pork (15 gm.); 2 tablespoons French dressing (30 gm.)	.....	105	1.5	11	.....	.....	0.01	0.2	15	.....	0.03	0.02	0.4
<i>Fish:</i>														
cod, haddock, cooked.....	1 medium serving	75	55	13.5	.....	.....	0.01	.15	0.4	.....	1	.04	0.06	1.6
halibut, herring, tuna, whitefish, cooked.....	1 medium serving tuna (60 gm.); others (75 gm.)	60	115	17.0	5	.....	.01	.19	0.8	60	.....	.04	0.06	6.0
salmon, canned.....	1 medium serving	75	125	15.0	7	.....	.11	.23	0.8	135	.....	.02	0.12	5.6
<i>Fruits:</i>														
banana.....	1 small	100	90	1.0	.....	22	.01	.03	0.6	430	10	.04	0.05	0.7
cantaloupe.....	½ melon, 4½ in. diameter	150	30	1.0	.....	7	.02	.02	0.6	5,130	50	.07	0.06	0.8
citrus.....	1 medium orange; ½ medium grapefruit; ¼ cup juice; 1 me- dium large lemon	100	45	0.5	.....	11	.03	.02	0.4	115	45	.06	0.02	0.2
yellow—fresh, canned, dried.....	Fresh (100 gm.); 1 medium peach, 2-3 apricots, 3 plums; dried (30 gm.); for sweet- ened, canned, dried, or fresh, add ½ serving sweets	.....	70	0.5	.....	17	.01	.03	0.6	910	6	.01	0.03	1.0
other—dried.....	3-4 dates; 1½-2 small figs; dried apple; ¼ cup raisins	30	80	0.5	.....	20	.03	.03	0.9	15	.....	.04	0.03	0.3
other—fresh and canned..	½ cup	100	55	0.5	.....	13	.01	.01	0.4	95	4	.04	0.03	0.2
Gravy, white sauce.....	½ cup	65	105	2.5	8	6	.07	.06	0.2	225	.....	.04	0.11	0.2
<i>Legumes:</i>														
beans, peas.....	½ cup cooked; dried (30 gm.)	.....	100	6.5	.....	18	.05	.13	2.0	10	1	.19	0.07	0.7
soybeans.....	½ cup cooked; dried (30 gm.)	.....	105	10.5	5	4	.07	.18	2.4	35	.....	.32	0.09	0.7
<i>Meat:</i>														
beef, lamb, veal, cooked..	1 medium serving	75	185†	21.5†	11†	.....	.01	.15	2.3	.....	.....	.07	0.17	3.7
fowl, cooked.....	1 medium serving	75	150	15.0	10	.....	.01	.16	1.7	.....	.....	.04	0.08	5.2
liver, cooked.....	1 small serving	60	125	14.0	5	6	.01	.29	4.7	32,100	19	.16	2.38	8.9
luncheon meats, cooked..	2 slices sausage, minced ham, dried beef, luncheon roll (30 gm.); ¼ frankfurter	.....	85	6.0	7	.....	.01	.05	0.9	.....	.....	.08	0.08	0.8
pork, ham, cooked.....	1 medium serving	75	180†	21.5†	10†	.....	0.01	0.16	2.2	.....	.....	0.47	0.17	3.5

† Tentative values based on R. M. Leverton and G. V. Odell, *The Nutritive Value of Cooked Meat* ("Miscellaneous Publications," No. MP-49, Oklahoma Agricultural Experiment Station [Oklahoma State University, 1958]).

TABLE 35—Continued

Food*	Approximate Measure	Weight (Gm.)	Calo- ries	Pro- tein (Gm.)	Fat (Gm.)	Carbo- hy- drate (Gm.)	Cal- cium (Gm.)	Phos- phorus (Gm.)	Iron (Mg.)	Vita- min A (I.U.)	Ascor- bic Acid (Mg.)	Thia- mine (Mg.)	Ribo- flavin (Mg.)	Niacin (Mg.)
Nuts.....	1 tablespoon peanut butter; 8- 15 walnut halves; 16 peanuts; 12-15 almonds; 12 pecan halves	15	90	4.0	7	3	0.01	0.06	0.3	.....	.....	0.04	0.02	2.3
Sweets:														
candy, sugar, syrup.....	1 tablespoon sugar, jelly, jam, syrup, honey; 1 serving plain Jello, plain candy (fondant or mints, 14 gm.); 6-oz. bot- tle soft drink	.....	55	.....	.....	14	.....	.....	.....	.....	.....	.....	.....	.....
candy bar.....	1 2-oz. chocolate-coated bar	.....	290	4.0	15	34	.06	.09	1.1	65	.....	.04	.17	1.1
molasses; sorghum.....	1 tablespoon	20	50	.....	.....	13	.04	.01	1.8	.....	.....	.02	.03	0.6
Vegetables:														
cabbage—cooked and sauerkraut.....	$\frac{2}{3}$ cup	100	25	1.5	.....	5	.05	.03	0.5	90	30†	.05	.05	0.3
cabbage, raw; cauliflower, cooked.....	1 cup cabbage (50 gm.); $\frac{1}{3}$ cup cauliflower (70 gm.)	.....	15	1.0	.....	3	.02	.03	0.5	50	22	.04	.04	0.2
corn; parsnips, cooked.....	$\frac{1}{2}$ cup corn; 1 large parsnip	100	85	2.0	1	19	.03	.07	0.6	195	10§	.07§	.09	0.6§
green and yellow:														
asparagus, cooked.....	cup	100	20	2.0	.....	3	.02	.05	1.0	1,040	18	.13	.17	1.2
broccoli, cooked.....	cup	100	30	3.0	.....	5	.13	.08	1.3	3,400	74	.07	.15	0.8
carrots, cooked.....	cup	100	30	0.5	.....	7	.03	.03	0.6	12,500	4	.05	.05	0.4§
green beans, cooked.....	cup	100	25	1.5	.....	5	.04	.02	0.7	660	14	.07	.10	0.5§
leafy greens, cooked.....	cup spinach, turnip, kale, other greens	100	30	2.5	.....	5	.20||	.05	2.7	10,400	33§	.08	.21	0.6§
peas, fresh, cooked, canned	$\frac{1}{2}$ cup	100	70	4.0	.....	13	.02	.09	1.8	630	15§	.25§	.14§	2.3§
sweet potato, cooked.....	$\frac{1}{2}$ large	100	140	2.0	1	31	.03	.05	0.8	8,605	22§	.10§	.06§	0.7§
potato, cooked.....	1 small (100 gm.); for fried add 1-2 servings fat; for French fried (50 gm.) add 1-2 serv- ings fat	.....	85	2.0	.....	19	.01	.06	0.7	20	14§	.09§	.03	1.0
tomato, fresh, canned, or juice.....	$\frac{1}{2}$ cup; 1 small tomato (100 gm.); for 2 $\frac{1}{2}$ tablespoons catsup (50 gm.) add $\frac{1}{2}$ serving sweets	.....	20	1.0	.....	4	.01	.02	0.5	1,035	18	.05	.03	0.8
other, cooked.....	$\frac{1}{2}$ cup beets, eggplant, onions, etc.	100	40	1.0	.....	9	.03	.05	0.6	80	8	.03	.04	0.3
other, commonly served raw.....	2 pieces celery; 8 slices cucum- ber; $\frac{1}{2}$ head lettuce	50	10	0.5	.....	2	0.02	0.02	0.2	105	4	0.02	0.03	0.2

† For sauerkraut, reduce by one-half.

§ For canned, reduce by one-half.

|| Calcium may be unavailable in chard, spinach, and beet greens.

and are suitable only when computing the energy value of such diets. Some specific energy factors for calculating caloric values of foods as compiled by the Bureau of Human Nutrition and Home Economics are given in Table 37 (p. 142).

The accuracy of the values in Table 35 was tested on two series of dietary records. These were computed first by the usual method, whereby each food item is calculated separately, and then by the short method. Series I consisted of 3-day dietary records for 21 high-school girls, and Series II, of 3-day records for 14 homemakers. Comparison of the results obtained by the two methods showed a high degree of accuracy for the values in the food composition table. The observed differences were shown by statistical tests to be due to errors in random sampling and not to real differences between the two methods. In Table 34 is given a comparison of the mean values obtained by each of the two methods on the first series of dietary records. It also shows the means for the short method as percentages of the corresponding means for the long method. It is evident that the values in the food composition table are highly satisfactory, since in no instance was the deviation as much as 2.5 per cent.

To illustrate the use of the food composition table, a sample day's menu from the record of one of the homemakers is given below:

BREAKFAST

Tomato juice	1 serving
Oatmeal	1 serving
Cream (light)	2 servings
Sugar	2 teaspoons
Bread, white enriched	1 slice
Butter	1 teaspoon
Milk, whole	1 cup

LUNCH

Macaroni and cheese	1 serving
Head lettuce, French dressing	1 serving
Applesauce, sweetened	1 serving
Cupcake	1
Bread, whole wheat	1 slice
Butter	1 teaspoon
Milk, whole	1 cup

MIDAFTERNOON

Chocolate bar	1
---------------	---

DINNER

Liver	1 small serving
Potato, baked	1 small
Butter	2 teaspoons
Green beans, buttered	1 serving
Celery	2 pieces
Bread, white enriched	1 slice
Butter	1 teaspoon
Chocolate pie	1 serving
Milk, whole	1 cup

This day's menu may be summarized as follows in preparing to calculate the nutritive value from the figures in Table 35:

Foods	Servings
<i>Cereals:</i>	
refined.....	1
whole grain or enriched.....	4
<i>Dairy products:</i>	
butter.....	5½
cheese, Cheddar.....	1
cream, light.....	2
milk, whole.....	3½
<i>Desserts:</i>	
cake, plain.....	¾
pie crust.....	1
pudding.....	1
Fruit: other, fresh or canned.....	1
Meat: liver.....	1
Sweets: candy bar.....	1
<i>Vegetables:</i>	
green beans.....	1
potato.....	1
tomato.....	1
other, raw.....	1

The nutritive content of the day's diet is then computed by multiplying the values in the food composition table by the number of servings and adding the various sums.

The short method has been found to result in a considerable

saving of time without sacrificing accuracy. It should be pointed out, however, that the method is most satisfactory when applied to a varied diet.

REFERENCES

1. DONELSON, E. G., and LEICHSENRING, J. M. Food composition table for short method of dietary analysis (revised), *J. Am. Dietet. A.*, 21:440, 1945.
2. WATT, B. K., and MERRILL, A. L. Composition of foods—raw, processed, prepared. (U.S. Department of Agriculture, "Agriculture Handbooks," No. 8.) 1950.
3. BOWES, A. DEP., and CHURCH, C. F. Food values of portions commonly used. 6th ed. Philadelphia: College Offset Press, 1946.
4. Consumption of food in the United States, 1909-1948. ("U.S. Department of Agriculture Miscellaneous Publications," No. 691.) 1949.

APPENDIX 2

FOOD VALUES IN COMMON PORTIONS

This compact food composition table, for reference use in class-work and meal planning, will enable nurses, clinicians, extension workers, and students to compare quickly the nutritive value of foods and to estimate the nutritive value of diets.

Data are given in quantities that can be readily adjusted to servings of different sizes. Values for prepared foods and food mixtures have been calculated from typical recipes. Values for cooked vegetables are without added fat.

The following abbreviations are used: gm. for gram; mg. for milligram; I.U. for International Unit; cal. for calories; Tr. for trace. Ounce refers to weight; fluid ounce to measure.

NUTRITIVE VALUE OF FOODS

[Dashes show that no basis could be found for imputing a value although there was some reason to believe that a measurable amount of the constituent might be present]

	Food, approximate measure, and weight (in grams)	Water	Food en- ergy	Pro- tein	Fat (total lipid)	Fatty acids				Carbo- hy- drate	Cal- cium	Iron	Vita- min A value	Thia- mine	Ribo- flavin	Nia- cin	Ascor- bic acid
						Satur- ated (total)	Unsaturated		Lino- leic								
							Oleic	Grams									
MILK, CREAM, CHEESE; RELATED PRODUCTS																	
	Milk, cow's:	Grams	Calo- ries	Grams	Grams	Grams	Grams	Grams	Grams	Milli- grams	Milli- grams	Inter- national Units	Milli- grams	Milli- grams	Milli- grams		
1	Fluid, whole..... 1 cup.....	244	165	9	10	6	3	Trace	12	285	0.1	390	0.08	0.42	0.2		
2	Fluid, nonfat (skim)..... 1 cup.....	246	90	9	Trace				13	298	.1	10	.10	.44	.2		
3	Buttermilk, cultured, from skim milk..... 1 cup.....	246	90	9	Trace				13	298	.1	10	.10	.44	.2		
4	Evaporated, unsweetened, undiluted..... 1 cup.....	252	345	18	20	11	7	1	24	635	.3	820	.10	.84	.5		
5	Condensed, sweetened, un- diluted..... 1 cup.....	306	985	25	25	14	8	1	170	829	.3	1,020	.24	1.21	.5		
6	Dry, whole..... 1 cup.....	103	515	27	28	15	9	1	39	968	.5	1,160	.30	1.50	.7		
7	Dry, nonfat..... 1 cup.....	80	290	29	1				42	1,040	.5	20	.28	1.44	.7		
8	Milk, goat's: Fluid, whole..... 1 cup.....	244	165	8	10	6	2	Trace	11	315	.2	390	.10	.27	.7		
	Cream:																
9	Half-and-half (milk and cream)..... 1 cup.....	242	330	8	29	16	10	1	11	259	.1	1,190	.07	.39	.1		
10	Light, table or coffee..... 1 tablespoon.....	15	20	Trace	2	1	1	Trace	1	16	0	70	0	.02	0		
11	Whipping, unwhipped (volume about double when whipped):..... 1 cup.....	240	525	7	52	29	17	2	10	238	.1	2,140	.07	.35	.1		
12	Medium..... 1 tablespoon.....	15	35	Trace	3	2	1	Trace	1	15	0	130	0	.02	0		
13	Heavy..... 1 cup.....	238	745	6	78	43	26	2	8	196	.1	3,200	.06	.29	.1		
14	Blue mold (Roquefort type)..... 1 ounce.....	28	45	Trace	5	3	2	Trace	1	12	0	200	0	.02	0		
15	Cheddar or American:																
16	Ungrated..... 1 cup.....	112	860	5	93	51	31	3	7	164	0	3,800	.05	.24	.1		
17	Grated..... 1 tablespoon.....	7	55	Trace	6	3	2	Trace	Trace	10	0	240	0	.02	0		
18	Cheddar, process..... 1 ounce.....	28	105	6	9	5	3	Trace	Trace	122	.2	350	.01	.17	.1		
19	Cheese foods, Cheddar..... 1 ounce.....	28	70	4	6	3	2	Trace	Trace	133	.2	230	Trace	.08	Trace		
20			455	28	37	20	12	1	2	874	1.2	1,510	.03	.53	.1		
21			30	2	2	1	1	Trace	Trace	55	.1	90	.02	.03	Trace		
22			105	7	9	5	3	Trace	Trace	214	.2	350	Trace	.12	Trace		
			95	6	7	4	2	Trace	2	163	.2	300	.01	.17	Trace		

* From *Home and Garden Bulletin*, No. 72, United States Department of Agriculture.

TABLE 36—Continued

	Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids				Carbohydrate	Calcium	Iron	Vitamin A value	Thiamine	Riboflavin	Niacin	Ascorbic acid
						Saturated (total)	Unsaturated		Lino- leic								
							Oleic	Grams										Grams
MILK, CREAM, CHEESE--Continued																	
Cheese--Continued																	
	Cottage cheese, from skim milk:	Per- cent	Calo- ries	Grams													
23	Creamed..... 1 cup.....	78	240	11	6	4	Trace	6		6	207	0.9	430	0.07	0.66	0.2	0
24	Uncreamed..... 1 ounce.....	78	30	4	1	Trace	Trace	1		1	25	.1	50	.01	.08	Trace	0
25	Uncreamed..... 1 cup.....	79	195	38	1	Trace	Trace	6		6	202	.9	20	.07	.64	.2	0
26	Uncreamed..... 1 ounce.....	79	25	5	Trace			1		1	26	.1	Trace	.01	.08	Trace	0
27	Cream cheese..... 1 ounce.....	51	105	2	11	6	4	Trace		1	18	.1	440	Trace	.07	Trace	0
28	Swiss..... 1 tablespoon.....	51	55	1	6	3	2	Trace		Trace	9	Trace	230	Trace	.04	Trace	0
29	Swiss..... 1 ounce.....	39	105	7	8	4	3	Trace		1	271	.3	320	.01	.06	Trace	0
Milk beverages:																	
30	Cocoa..... 1 cup.....	79	235	9	11	6	4	Trace		26	286	.9	390	.09	.45	.4	2
31	Chocolate-flavored milk 1 cup.....	83	190	8	6	3	2	Trace		27	270	.4	210	.09	.41	.2	2
32	Malted milk..... 1 cup.....	78	280	13	12	7	4	Trace		32	364	.8	670	.17	.56		2
Milk desserts:																	
33	Cornstarch pudding, plain 1 cup.....	76	275	9	10	6	3	Trace		39	290	.1	390	.07	.40	.1	2
34	Custard, baked..... 1 cup.....	77	285	13	14	6	5	1		28	278	1.0	870	.10	.47	.2	1
35	Ice cream, plain, factory packed:																
	Slice or cut brick, 1/4 of 1 slice or cut	62	145	3	9	5	3	Trace		15	87	.1	370	.03	.13	.1	1
	brick.																
36	Container..... 3 1/2 fluid ounces.	62	130	2	8	4	3	Trace		13	76	.1	320	.03	.12	.1	1
37	Container..... 8 fluid ounces.																
38	Ice milk..... 1 cup.....	62	295	6	18	10	6	1		29	175	.1	740	.06	.27	.1	1
39	Yoghurt, from partially skimmed milk.	.67	285	9	10	6	3	Trace		42	292	.2	390	.09	.41	.2	2
	Whole, without shell..... 1 egg.....	89	120	8	4	2	1	Trace		13	295	.1	170	.09	.43	.2	2
EGGS																	
Eggs, large, 24 ounces per dozen:																	
Raw:																	
40	Whole, without shell..... 1 egg.....	74	80	6	6	2	3	Trace		Trace	27	1.1	590	.05	.15	Trace	0

41	White of egg-----	1 white-----	33----	88	15	4	Trace	-----	Trace	3	Trace	0	Trace	.09	Trace	0
42	Yolk of egg-----	1 yolk-----	17----	51	60	3	5	2	Trace	2	Trace	580	.04	.07	Trace	0
	Cooked:															
43	Boiled, shell removed-----	2 eggs-----	100----	74	160	13	12	4	1	5	1	1,180	.09	.28	.1	0
44	Scrambled, with milk and fat.	1 egg-----	64----	72	110	7	8	3	1	4	1	690	.05	.18	Trace	0
MEAT, POULTRY, FISH, SHELLFISH; RELATED PRODUCTS																
45	Bacon, broiled or fried crisp	2 slices-----	16----	8	95	5	8	3	1	4	1	0	.08	.05	.8	-----
	Beef, trimmed to retail basis, ¹ cooked:															
	Cuts braised, simmered, or pot-roasted:															
46	Lean and fat-----	3 ounces-----	85----	53	245	23	16	8	Trace	7	0	30	.04	.18	3.5	-----
47	Lean only-----	2.5 ounces-----	72----	62	140	22	5	2	Trace	2	0	10	.04	.16	3.3	-----
48	Hamburger, broiled:															
49	Market ground-----	3 ounces-----	85----	54	245	21	17	8	Trace	7	0	30	.07	.02	4.6	-----
	Ground lean-----	3 ounces-----	85----	60	185	23	10	5	Trace	4	0	20	.08	.20	5.1	-----
	Roast, oven-cooked, no liquid added:															
	Relatively fat, such as rib:															
50	Lean and fat-----	3 ounces-----	85----	38	390	16	36	17	1	16	0	70	.04	.13	3.0	-----
51	Lean only-----	1.8 ounces-----	51----	57	120	14	7	3	Trace	3	0	10	.04	.11	2.6	-----
	Relatively lean, such as round:															
52	Lean and fat-----	3 ounces-----	85----	56	220	23	14	7	Trace	6	0	30	.06	.18	4.2	-----
53	Lean only-----	2.5 ounces-----	71----	63	130	21	4	2	Trace	2	0	10	.05	.16	3.8	-----
	Steak, broiled:															
	Relatively fat, such as sirloin:															
54	Lean and fat-----	3 ounces-----	85----	44	330	20	27	13	1	12	0	50	.05	.16	4.0	-----
55	Lean only-----	2 ounces-----	56----	59	115	18	4	2	Trace	2	0	10	.05	.14	3.6	-----
	Relatively lean, such as round:															
56	Lean and fat-----	3 ounces-----	85----	55	220	24	13	6	Trace	6	0	20	.07	.19	4.8	-----
57	Lean only-----	2.4 ounces-----	69----	61	130	22	4	2	Trace	2	0	10	.06	.16	4.2	-----
	Beef, canned:															
58	Corned beef-----	3 ounces-----	85----	59	180	22	10	5	Trace	4	0	20	.01	.20	2.9	-----
59	Corned beef hash-----	3 ounces-----	85----	70	120	12	5	2	Trace	2	6	10	.02	.11	2.4	-----
60	Beef, dried or chipped-----	2 ounces-----	57----	48	115	19	4	2	Trace	2	0	11	.04	.18	2.2	-----
61	Beef and vegetable stew-----	1 cup-----	235----	82	185	15	10	5	Trace	4	15	2,530	.13	.18	4.4	14
62	Beef potpie, baked: Individual pie, 4 1/4-inch-diameter, weight before baking about 8 ounces.	1 pie-----	227----	63	460	18	28	10	1	15	32	2,830	.07	.14	3.0	Trace
63	Chicken, cooked:															
	Flesh and skin, broiled-----	3 ounces with- out bone.	85----	61	185	23	9	3	2	4	0	260	.04	.15	7.1	-----

¹ Outer layer of fat on the cut was removed to within approximately 1/2 inch of the lean. Deposits of fat within the cut were not removed.

TABLE 36—Continued

	Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids				Carbohydrate	Calcium	Iron	Vitamin A value	Thiamine	Riboflavin	Niacin	Ascorbic acid
						Unsaturated			Saturated (total)								
						Oleic	Linoleic										
				Grams	Grams	Grams	Grams	Grams	Grams	Milligrams	Milligrams	International Units	Milligrams	Milligrams	Milligrams	Milligrams	
MEAT, POULTRY, FISH, SHELLFISH—Continued																	
	Chicken, cooked—Continued	Per cent	Calories	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Milligrams <td>Milligrams<td>International Units<td>Milligrams<td>Milligrams<td>Milligrams<td>Milligrams</td></td></td></td></td></td>	Milligrams <td>International Units<td>Milligrams<td>Milligrams<td>Milligrams<td>Milligrams</td></td></td></td></td>	International Units <td>Milligrams<td>Milligrams<td>Milligrams<td>Milligrams</td></td></td></td>	Milligrams <td>Milligrams<td>Milligrams<td>Milligrams</td></td></td>	Milligrams <td>Milligrams<td>Milligrams</td></td>	Milligrams <td>Milligrams</td>	Milligrams
64	Breast, fried, ½ breast:	52	215	24	12	3	6	2		10	1.1	60	0.03	0.06	9.4		
65	With bone.....	52	215	24	12	3	6	2		10	1.1	60	0.03	0.06	9.4		
	Flesh and skin only.....																
	Leg, fried (thigh and drumstick):																
66	With bone.....	52	245	27	15	4	7	2		13	1.8	220	0.05	.18	4.7		
67	Flesh and skin only.....	52	245	27	15	4	7	2		13	1.8	220	0.05	.18	4.7		
68	Chicken, canned, boneless.....	62	170	25	7	2	3	1	0	12	1.5	160	0.03	.14	5.4		
	Chicken potpie. See Poultry potpie.																
	Chile con carne, canned:																
69	With beans.....	72	335	19	15	7	7	Trace	30	98	4.2	150	.08	.20	3.5		
70	Without beans.....	67	510	26	38	18	17	1	15	97	3.6	380	.05	.31	5.6		
71	Heart, beef, trimmed of fat, 3 ounces.....	61	160	26	5	2	2	Trace	1	14	5.9	30	.23	1.05	6.8	3	
	braised.																
	Lamb, trimmed to retail basis, ¹ cooked:																
72	Chop, thick, with bone, 1 chop, 4.8 ounces.....	47	405	25	33	18	12	1	0	10	3.1		.14	.25	4.5		
	broiled.																
73	Lean and fat.....	47	405	25	33	18	12	1	0	10	3.1		.14	.25	5.6		
74	Lean only.....	62	140	21	6	3	2	Trace	0	9	2.5		.11	.20	4.5		
	Leg, roasted:																
75	Lean and fat.....	54	235	22	16	9	6	Trace	0	9	2.8		.13	.23	4.7		
76	Lean only.....	62	130	20	5	3	2	Trace	0	9	2.6		.12	.21	4.4		
	Shoulder, roasted:																
77	Lean and fat.....	50	285	18	23	13	8	1	0	8	2.4		.11	.20	4.0		
78	Lean only.....	61	130	17	6	3	2	Trace	0	8	2.2		.10	.18	3.7		
79	Liver, beef, fried.....	57	120	13	4	2	2	Trace	6	5	4.4	30, 330	.15	2.25	8.4	18	
	Pork, cured, cooked:																
80	Ham, smoked, lean and fat.....	48	290	18	24	9	10	2	1	8	2.2	0	.39	.15	3.1		
	Luncheon meat:																
81	Cooked ham, sliced.....	48	170	13	13	5	5	1	0	5	1.5	0	.57	.15	2.9		
82	Canned, spiced or unspiced.....	55	165	8	14	5	6	1	1	5	1.2	0	.18	.12	1.6		

83	Pork, fresh, trimmed to retail basis, ¹ cooked: Chop, thick, with bone-----	1 chop, 3.5 ounces.	98----	42	260	16	21	8	9	2	0	8	2.2	0	.63	.18	3.8	-----
84	Lean and fat-----	2.3 ounces-----	66----	42	260	16	21	8	9	2	0	8	2.2	0	.63	.18	3.8	-----
85	Lean only-----	1.7 ounces-----	48----	53	130	15	7	3	3	1	0	7	1.9	0	.54	.16	3.3	-----
	Roast, oven-cooked, no liquid added:																	
86	Lean and fat-----	3 ounces-----	85----	46	310	21	24	9	10	2	0	9	2.7	0	.78	.22	4.7	-----
87	Lean only-----	2.4 ounces-----	68----	55	175	20	10	4	4	1	0	9	2.6	0	.73	.21	4.4	-----
	Cuts simmered:																	
88	Lean and fat-----	3 ounces-----	85----	46	320	20	26	9	11	2	0	8	2.5	0	.46	.21	4.1	-----
89	Lean only-----	2.2 ounces-----	63----	60	135	18	6	2	3	1	0	8	2.3	0	.42	.19	3.7	-----
90	Poultry potpie (chicken or turkey): Individual pie, 4¼-inch-diameter, about 8 ounces.	1 pie-----	227----	60	485	17	28	8	15	3	39	41	1.6	1,860	.07	.14	3.2	Trace
	Sausage:																	
91	Bologna, slice 4.1 by 0.1 inch.	8 slices-----	227----	56	690	27	62	26	27	3	2	16	4.1	-----	.36	.49	6.0	-----
92	Frankfurter, cooked-----	1 frankfurter--	51----	58	155	6	14	6	6	1	1	3	.8	-----	.08	.10	1.3	-----
93	Pork, bulk, canned-----	4 ounces-----	113----	55	340	18	29	10	12	3	0	10	2.6	0	.23	.27	3.4	-----
94	Tongue, beef, simmered-----	3 ounces-----	85----	61	205	18	14	7	6	Trace	Trace	7	2.5	-----	.04	.26	3.1	-----
	Turkey potpie. See Poultry potpie.																	
	Veal, cooked:																	
95	Cutlet, broiled-----	3 ounces without bone.	85----	60	185	23	9	4	4	Trace	0	9	2.7	-----	.06	.21	4.6	-----
96	Roast, medium fat, medium done: Lean and fat.	3 ounces-----	85----	55	305	23	14	7	6	Trace	0	10	2.9	-----	.11	.26	6.6	-----
	Fish and shellfish:																	
97	Bluefish, baked or broiled.	3 ounces-----	85----	68	135	22	4	-----	-----	-----	0	25	.6	40	.09	.08	1.6	-----
	Clams:																	
98	Raw, meat only-----	3 ounces-----	85----	80	70	11	1	-----	-----	-----	3	82	6.0	90	.08	.15	1.4	-----
99	Canned, solids and liquid.	3 ounces-----	85----	87	45	7	1	-----	-----	-----	2	74	5.4	70	.04	.08	.9	-----
100	Crabmeat, canned or cooked.	3 ounces-----	85----	77	90	14	2	-----	-----	-----	1	38	.8	-----	.04	.05	2.1	-----
101	Fishsticks, breaded, cooked, frozen; stick, 3.8 by 1.0 by 0.5 inch.	10 sticks or 8-ounce package.	227----	66	400	38	20	5	4	10	15	25	.9	-----	.09	.16	3.6	-----
102	Haddock, fried-----	3 ounces-----	85----	67	135	16	5	1	3	Trace	6	15	.5	50	.03	.08	2.2	-----
	Mackerel:																	
103	Broiled, Atlantic-----	3 ounces-----	85----	62	200	19	13	-----	-----	-----	0	5	1.0	450	.13	.23	6.5	-----
104	Canned, Pacific, solids and liquid.	3 ounces-----	85----	66	155	18	9	-----	-----	-----	0	221	1.9	20	.02	.28	7.4	-----

¹ Outer layer of fat on the cut was removed to within approximately ½ inch of the lean. Deposits of fat within the cut were not removed.

TABLE 36—Continued

	Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids				Carbohydrate	Calcium	Iron	Vitamin A value	Thiamine	Riboflavin	Niacin	Ascorbic acid
						Saturated (total)	Unsaturated		Grams								
							Oleic	Linoleic									
		Per cent	Calories	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Grams	International Units	Milligrams	Milligrams	Milligrams	Milligrams
MEAT, POULTRY, FISH, SHELLFISH—Continued																	
	Fish and shellfish—Continued	Grams															
105	Ocean perch, breaded (egg and breadcrumbs), fried.	85	195	16	11						6	14	50	0.09	0.10	1.7	
106	Oysters, meat only: Raw, 1 cup	240	160	20	4						8	226	740	.30	.39	6.6	
107	13-19 medium selects.																
	Oyster stew, 1 part oysters to 3 parts milk by volume, 3-4 oysters.	230	200	11	12						11	269	640	.12	.40	1.7	
108	Salmon, pink, canned	85	120	17	5	1	1			0	2159	.7	60	.03	.16	6.8	
109	Sardines, Atlantic type, canned in oil, drained solids.	85	180	22	9	2	2	4		1	367	2.5	190	.02	.18	4.6	
110	Shad, baked	85	170	20	10					0	20	.5	20	.11	.22	7.3	
111	Shrimp, canned, meat only	85	110	23	1						98	2.6	50	.01	.03	1.9	
112	Swordfish, broiled with butter or margarine.	85	150	24	5					0	23	1.1	1,750	.03	.04	9.3	
113	Tuna, canned in oil, drained solids.	85	170	25	7	2	1	4		0	7	1.2	70	.04	.10	10.9	
MATURE DRY BEANS AND PEAS, NUTS, PEANUTS; RELATED PRODUCTS																	
114	Almonds, shelled	142	850	26	77	6	52	15		28	332	6.7	0	.34	1.31	5.0	Trace
Beans, dry:																	
Common varieties, such as																	
Great Northern, navy, and others, canned:																	
115	Red	256	230	15	1					42	74	4.6	0	.13	.13	1.5	Trace
White, with tomato or molasses:																	
116	With pork	261	330	16	7	3	3	1		54	172	4.4	140	.13	.10	1.3	5
117	Without pork	261	315	16	1					60	183	5.2	140	.13	.10	1.3	5
118	Lima, cooked	192	260	16	1					48	56	5.6	Trace	.26	.12	1.3	Trace

119	Brazil nuts, broken pieces	1 cup	140	5	905	20	92	18	44	24	15	260	4.8	Trace	1.21	.46	1.9	
120	Cashew nuts, roasted	1 cup	135	5	770	25	65	11	46	5	35	51	5.1		.49			
	Coconut:																	
121	Fresh, shredded	1 cup	97	50	330	3	31	27	2		13	15	1.7	0	.06	.03	.5	4
122	Dried, shredded, sweetened	1 cup	62	3	345	2	24	21	2		33	13	1.6	0	.04	.02	.4	0
123	Cowpeas or blackeye peas, dry, cooked	1 cup	248	80	190	13	1				34	42	3.2	20	.41	.11	1.1	Trace
	Peanuts, roasted, shelled:																	
124	Halves	1 cup	144	2	840	39	71	16	31	21	28	104	3.2	0	.47	.19	24.6	0
125	Chopped	1 tablespoon	9	2	50	2	4	1	2	1	2	6	.2	0	.03	.01	1.5	0
126	Peanut butter	1 tablespoon	16	2	90	4	8	2	4	2	3	12	.4	0	.02	.02	2.8	0
127	Peas, split, dry, cooked	1 cup	250	70	290	20	1				52	28	4.2	120	.36	.22	2.2	Trace
	Pecans:																	
128	Halves	1 cup	108	3	740	10	77	5	49	15	16	79	2.6	140	.93	.14	1.0	2
129	Chopped	1 tablespoon	7.5	3	50	1	5	Trace	3	1	1	5	.2	10	.06	.01	.1	Trace
	Walnuts, shelled:																	
130	Black or native, chopped	1 cup	126	3	790	26	75	4	26	36	19	Trace	7.6	380	.28	.14	.9	
	English or Persian:																	
131	Halves	1 cup	100	4	650	15	64	4	10	40	16	99	3.1	30	.33	.13	.9	3
132	Chopped	1 tablespoon	8	4	50	1	5	Trace	1	3	1	8	.2	Trace	.03	.01	.1	Trace
VEGETABLES AND VEGETABLE PRODUCTS																		
	Asparagus:																	
133	Cooked, cut spears	1 cup	175	92	35	4	Trace				6	33	1.8	1,820	.23	.30	2.1	40
	Canned spears, medium:																	
134	Green	6 spears	96	92	20	2	Trace				3	18	1.8	770	.06	.08	.9	17
135	Bleached	6 spears	96	92	20	2	Trace				4	15	1.0	70	.05	.07	.8	17
	Beans:																	
136	Lima, immature, cooked	1 cup	160	75	150	8	1				29	46	2.7	460	.22	.14	1.8	24
	Snap, green:																	
	Cooked:																	
137	In small amount of water, short time.	1 cup	125	92	25	2	Trace				6	45	.9	830	.09	.12	.6	18
138	In large amount of water, long time.	1 cup	125	92	25	2	Trace				6	45	.9	830	.06	.11	.5	12
	Canned:																	
139	Solids and liquid	1 cup	239	94	45	2	Trace				10	65	3.3	990	.08	.10	.7	9
140	Strained or chopped	1 ounce	28	93	5	Trace	Trace				1	10	.3	120	.01	.02	.1	1
	Bean sprouts. See Sprouts.																	
141	Beets, cooked, diced	1 cup	165	88	70	2	Trace				16	35	1.2	30	.03	.07	.5	11
142	Broccoli spears, cooked	1 cup	150	90	45	5	Trace				8	195	2.0	5,100	.10	.22	1.2	111
143	Brussels sprouts, cooked	1 cup	130	85	60	6	1				12	44	1.7	520	.05	.16	.6	61

² If bones are discarded, calcium content is much lower. Bones equal about 2 percent by weight of total contents of can.

TABLE 36—Continued

	Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids				Carbohydrate	Calcium	Iron	Vitamin A value	Thiamine	Riboflavin	Niacin	Ascorbic acid
						Unsaturated			Saturated (total)								
						Oleic	Linoleic										
			Calories	Grams	Grams	Grams	Grams	Grams	Grams	Milligrams	Milligrams	International Units	Milligrams	Milligrams	Milligrams	Milligrams	Milligrams
VEGETABLES—Continued																	
	Cabbage:																
	Raw:																
144	Finely shredded..... 1 cup.....	100	25	1	Trace	---	---	---	5	46	0.5	80	0.06	0.05	0.3	50	
145	Coleslaw..... 1 cup.....	120	100	2	7	1	1	4	9	47	.5	80	.06	.05	.3	50	
	Cooked:																
146	In small amount of water, 1 cup..... short time.	170	40	2	Trace	---	---	---	9	78	.8	150	.08	.08	.5	53	
147	In large amount of water, 1 cup..... long time.	170	40	2	Trace	---	---	---	9	78	.8	150	.05	.05	.3	32	
	Cabbage, celery or Chinese:																
148	Raw, leaves and stem, 1 cup..... 1-inch pieces.	100	15	1	Trace	---	---	---	2	43	.9	260	.03	.04	.4	31	
149	Cooked..... 1 cup.....	190	25	2	1	---	---	---	5	82	1.7	490	.04	.06	.6	42	
	Carrots:																
	Raw:																
150	Whole, 5½ by 1 inch (25 thin strips). 1 carrot.....	50	20	1	Trace	---	---	---	5	20	.4	6,000	.03	.03	.3	3	
151	Grated..... 1 cup.....	110	45	1	Trace	---	---	---	10	43	.9	13,200	.06	.06	.7	7	
152	Cooked, diced..... 1 cup.....	145	45	1	1	---	---	---	9	38	.9	18,130	.07	.07	.7	6	
153	Canned, strained or 1 ounce..... chopped.	28	5	Trace	0	---	---	---	2	7	.2	3,400	.01	.01	.1	1	
154	Cauliflower, cooked, flower-buds. 1 cup.....	120	30	3	Trace	---	---	---	6	26	1.3	110	.07	.10	.6	34	
	Celery, raw:																
155	Stalk, large outer, 8 by about 1½ inches at root end. 1 stalk.....	40	5	1	Trace	---	---	---	1	20	.2	0	.02	.02	.2	3	
156	Pieces, diced..... 1 cup.....	100	20	1	Trace	---	---	---	4	50	.5	0	.05	.04	.4	7	
157	Collards, cooked..... 1 cup.....	190	75	7	1	---	---	---	14	473	3.0	14,500	.15	.46	3.2	84	
	Corn, sweet:																
158	Cooked, ear 5 by 1¾ inches. 1 ear.....	140	65	2	1	---	---	---	16	4	.5	3,300	.09	.08	1.1	10	
159	Canned, solids and liquid... 1 cup.....	256	170	5	1	---	---	---	41	10	1.3	3,520	.07	.13	2.4	14	
160	Cowpeas, cooked, immature seeds. 1 cup.....	160	150	11	1	---	---	---	25	59	4.0	620	.46	.13	1.3	12	

Cucumbers, 10-ounce; 7½ by about 2 inches:														
161	Raw, pared.....	1 cucumber.....	207	96	25	1	Trace							
162	Raw, pared, center slice ⅛-inch thick.	6 slices.....	50	96	5	Trace	Trace							
163	Dandelion greens, cooked.....	1 cup.....	180	86	80	5	1							
164	Endive, curly (including escarole).	2 ounces.....	57	93	10	1	Trace							
165	Kale, cooked.....	1 cup.....	110	87	45	4	1							
166	Lettuce, headed, raw:													
	Head, looseleaf, 4-inch-diameter.	1 head.....	220	95	30	3	Trace							
167	Head, compact, 4¼-inch-diameter, 1 pound.	1 head.....	454	95	70	5	1							
168	Leaves.....	2 large or 4 small.	50	95	5	1	Trace							
169	Mushrooms, canned, solids and liquid.	1 cup.....	244	93	30	3	Trace							
170	Mustard greens, cooked.....	1 cup.....	140	92	30	3	Trace							
171	Okra, cooked, pod 3 by ⅝ inch.	8 pods.....	85	90	30	2	Trace							
Onions:														
Mature:														
172	Raw, onion 2½-inch-diameter.	1 onion.....	110	88	50	2	Trace							
173	Cooked.....	1 cup.....	210	90	80	2	Trace							
174	Young green, small, without tops.	6 onions.....	50	88	25	Trace	Trace							
175	Parsley, raw, chopped.....	1 tablespoon.....	3.5	84	1	Trace	Trace							
176	Parsnips, cooked.....	1 cup.....	155	84	95	2	1							
Peas, green:														
177	Cooked.....	1 cup.....	160	82	110	8	1							
178	Canned, solids and liquid.....	1 cup.....	249	82	170	8	1							
179	Canned, strained.....	1 ounce.....	28	86	10	1	Trace							
180	Peppers, hot, red, without seeds, dried; ground chili powder.	1 tablespoon.....	15	13	50	2	1							
Peppers, sweet:														
Raw, medium, about 6 per pound:														
181	Green pod without stem and seeds.	1 pod.....	62	93	15	1	Trace							
182	Red pod without stem and seeds.	1 pod.....	60	91	20	1	Trace							
183	Canned, pimientos, medium.	1 pod.....	38	92	10	Trace	Trace							
184	Potatoes, medium, about 3 per pound: Baked, peeled after baking.	1 potato.....	99	75	90	3	Trace							

³ Vitamin A value is based on yellow corn; white corn contains only a trace.

TABLE 36—Continued

	Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids			Carbohydrate	Calcium	Iron	Vitamin A value	Thiamine	Riboflavin	Niacin	Ascorbic acid
						Saturated (total)	Unsaturated									
							Oleic	Linoleic								
VEGETABLES—Continued																
Potatoes—Continued																
Boiled:																
185	Peeled after boiling..... 1 potato.....	Grams 136.....	Calories 105	3	Trace	Grams	Grams	Grams	Grams 23	Milligrams 10	Milligrams 0.8	International Units Trace	Milligrams 0.13	Milligrams 0.05	Milligrams 2.0	Milligrams 22
186	Peeled before boiling..... 1 potato.....	122.....	90	3	Trace	-----	-----	-----	21	9	.7	Trace	.11	.04	1.4	20
French-fried, piece 2 by ½ by ½ inch:																
187	Cooked in deep fat, ready to eat. 10 pieces.....	57.....	155	2	7	2	1	4	20	9	.7	Trace	.06	.04	1.8	8
188	Frozen, ready to heat for serving. 10 pieces.....	57.....	95	2	4	1	1	2	15	4	.8	Trace	.08	.01	1.2	10
Mashed:																
189	Milk added..... 1 cup.....	195.....	145	4	1	-----	-----	-----	30	47	1.0	50	.17	.11	.2	17
190	Milk and butter added... 1 cup.....	195.....	230	4	12	7	4	Trace	28	45	1.0	470	.16	.10	1.6	16
191	Potato chips, medium, 2-inch-diameter. 10 chips.....	20.....	110	1	7	2	2	4	10	6	.4	Trace	.04	.02	.6	2
192	Pumpkin, canned..... 1 cup.....	228.....	75	2	1	-----	-----	-----	18	46	1.6	7,750	.04	.14	1.2	-----
193	Radishes, raw, small, without tops. 4 radishes.....	40.....	10	Trace	Trace	-----	-----	-----	2	15	.4	10	.01	.01	.1	10
194	Sauerkraut, canned, drained solids. 1 cup.....	150.....	30	2	Trace	-----	-----	-----	7	54	.8	60	.05	.10	.2	24
Spinach:																
195	Cooked..... 1 cup.....	180.....	45	6	1	-----	-----	-----	6	223	3.6	21,200	.14	.36	1.1	54
196	Canned, drained solids... 1 cup.....	180.....	45	6	1	-----	-----	-----	6	223	3.6	13,740	.04	.21	.7	26
197	Canned, strained and creamed. 1 ounce.....	28.....	10	1	Trace	-----	-----	-----	2	419	.3	750	.01	.03	.1	1
Sprouts, raw:																
198	Mung bean..... 1 cup.....	90.....	20	3	Trace	-----	-----	-----	4	26	.7	10	.06	.08	.5	14
199	Soybean..... 1 cup.....	107.....	50	7	1	-----	-----	-----	6	51	1.1	190	.24	.21	.9	14
Squash:																
Cooked:																
200	Summer, diced..... 1 cup.....	210.....	35	1	Trace	-----	-----	-----	8	32	.8	550	.08	.15	1.3	23
201	Winter, baked, mashed... 1 cup.....	205.....	95	4	1	-----	-----	-----	23	49	1.6	12,690	.10	.31	1.2	14
202	Canned, winter, strained or chopped. 1 ounce.....	28.....	10	Trace	Trace	-----	-----	-----	2	7	.1	510	.01	.01	.1	1

TABLE 36—Continued

Sweetpotatoes:														
Cooked, medium, 5 by 2 inches, weight raw about 6 ounces:														
203	Baked, peeled after baking.	1 sweetpotato.	110	64	155	2	1						36	44
204	Boiled, peeled after boiling.	1 sweetpotato.	147	71	170	2	1						39	47
205	Candied, 3½ by 2¼ inches.	1 sweetpotato.	175	60	295	2	6	2	3	1			60	65
206	Canned, vacuum or solid pack.	1 cup.	218	72	235	4	Trace						54	54
Tomatoes:														
207	Raw, medium, 2 by 2½ inches, about 3 per pound.	1 tomato.	150	94	30	2	Trace						6	16
208	Canned or cooked.	1 cup.	242	94	45	2	Trace						9	27
209	Tomato juice, canned.	1 cup.	242	94	50	2	Trace						10	17
210	Tomato catsup.	1 tablespoon.	17	70	15	Trace	Trace						4	2
211	Turnips, cooked, diced.	1 cup.	155	92	40	1	Trace						9	62
Turnip greens:														
Cooked:														
212	In small amount of water, short time.	1 cup.	145	90	45	4	1						8	376
213	In large amount of water, long time.	1 cup.	145	90	45	4	1						8	376
214	Canned, solids and liquid.	1 cup.	232	94	40	3	1						7	232
FRUITS AND FRUIT PRODUCTS														
215	Apples, raw, medium, 2½-inch-diameter, about 3 per pound.	1 apple.	150	85	70	Trace	Trace						18	8
216	Apple brown betty.	1 cup.	230	64	350	4	8	4	3	Trace			69	41
217	Applejuice, fresh or canned.	1 cup.	249	86	125	Trace	0						34	15
Applesauce, canned:														
218	Sweetened.	1 cup.	254	80	185	Trace	Trace						50	10
219	Unsweetened.	1 cup.	239	88	100	Trace	Trace						26	10
Apricots:														
220	Raw, about 12 per pound.	3 apricots.	114	85	55	1	Trace						14	18
Canned in heavy sirup:														
221	Halves and sirup.	1 cup.	259	77	220	2	Trace						57	28
222	Halves, medium, and sirup.	4 halves; 2 tablespoons sirup.	122	77	105	1	Trace						27	13
Dried:														
223	Uncooked, 40 small.	40 halves, 1 cup.	150	25	390	8	1						100	100
224	Cooked, fruit and liquid.	1 cup.	285	76	240	5	1						62	63

* Calcium may not be usable because of presence of oxalic acid.

TABLE 36—Continued

	Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids			Carbohydrate	Calcium	Iron	Vitamin A value	Thiamine	Riboflavin	Niacin	Ascorbic acid
						Unsaturated		Linoleic								
						Saturated (total)	Oleic									
FRUITS—Continued																
	Grams	Percent	Calories	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Milligrams	International Units	Milligrams	Milligrams	Milligrams	Milligrams
225	Apricots and applesauce, 1 ounce----- canned (strained or chopped).	28	20	Trace	Trace	Trace	Trace	Trace	5	3	0.2	440	0.01	0.01	0.1	Trace
226	Apricot nectar----- Avocados, raw: California varieties, mainly Fuerte: 10-ounce avocado, about ½ avocado----- 3½ by 4¼ inches, peeled, pitted.	250	140	1	Trace	Trace	Trace	Trace	36	22	.5	2,380	.02	.02	.5	7
227	10-ounce avocado, about ½ avocado----- 3½ by 4¼ inches, peeled, pitted.	108	185	2	18	4	8	2	6	11	.6	310	.12	.21	1.7	15
228	½-inch cubes----- Florida varieties: 13-ounce avocado, about ½ avocado----- 4 by 3 inches, peeled, pitted.	152	260	3	26	5	12	3	9	15	.9	430	.16	.30	2.4	2
229	13-ounce avocado, about ½ avocado----- 4 by 3 inches, peeled, pitted.	123	160	2	14	3	6	2	11	12	.7	350	.13	.24	2.0	17
230	½-inch cubes----- Bananas, raw, 6 by 1½ inches, about 3 per pound.	152	195	2	17	3	8	2	13	15	.9	430	.16	.30	2.4	21
231	1 banana-----	150	85	1	Trace	Trace	Trace	Trace	23	8	.7	190	.05	.06	.7	10
232	Blackberries, raw-----	144	85	2	1	Trace	Trace	Trace	19	46	1.3	290	.05	.06	.5	30
233	Blueberries, raw-----	140	85	1	1	Trace	Trace	Trace	21	21	1.4	140	.04	.08	.6	20
234	Cantaloups, raw, medium, 5- inch-diameter, about 1½ pounds.	385	40	1	Trace	Trace	Trace	Trace	9	33	.8	5,590	.09	.07	1.0	63
Cherries:																
235	Raw, sour, sweet, hybrid---	114	65	1	1	Trace	Trace	Trace	15	19	.4	650	.05	.06	.4	9
236	Canned, rcd, sour, pitted---	247	105	2	1	Trace	Trace	Trace	26	37	.7	1,680	.07	.06	.4	13
237	Cranberry juice cocktail, canned.	250	140	Trace	Trace	Trace	Trace	Trace	36	10	.5	20	.02	.02	.1	5
238	Cranberry sauce, sweetened, canned or cooked.	277	550	Trace	1	Trace	Trace	Trace	142	22	.8	80	.06	.06	.3	5
239	Dates, "fresh" and dried, pitted, cut.	178	505	4	1	Trace	Trace	Trace	134	105	5.7	100	.16	.17	3.9	0

TABLE 36—Continued

	Figs:		78	90	2	Trace				22	62	.7	90	.06	.06	.6	2
240	Raw, small, 1½-inch-diameter, about 12 per pound.	3 figs-----	114--														
241	Dried, large, 2 by 1 inch---	1 fig-----	21--	60	1	Trace				15	40	.7	20	.02	.02	.1	0
242	Fruit cocktail, canned in heavy sirup, solids and liquid.	1 cup-----	256--	195	1	1				50	23	1.0	360	.04	.03	1.1	5
	Grapefruit:																
	Raw, medium, 4¼-inch-diameter, size 64:																
243	White-----	½ grapefruit--	285--	50	1	Trace				14	21	.5	10	.05	.02	.2	50
244	Pink or red-----	½ grapefruit--	285--	55	1	Trace				14	21	.5	590	.05	.02	.2	48
245	Raw sections, white-----	1 cup-----	194--	75	1	Trace				20	31	.8	20	.07	.03	.3	72
	Canned:																
246	Sirup pack, solids and liquid.	1 cup-----	249--	170	1	Trace				44	32	.7	20	.07	.04	.5	75
247	Water pack, solids and liquid.	1 cup-----	240--	70	1	Trace				18	31	.7	20	.07	.04	.5	72
	Grapefruit juice:																
248	Fresh-----	1 cup-----	246--	95	1	Trace				23	22	.5	20	.09	.04	.4	92
	Canned:																
249	Unsweetened-----	1 cup-----	247--	100	1	Trace				24	20	1.0	20	.07	.04	.4	84
250	Sweetened-----	1 cup-----	250--	130	1	Trace				32	20	1.0	20	.07	.04	.4	78
	Frozen, concentrate, unsweetened:																
251	Undiluted, can, 6 fluid ounces.	1 can-----	207--	300	4	1				72	70	.8	60	.29	.12	1.4	286
252	Water added-----	1 cup-----	247--	100	1	Trace				24	25	.2	20	.10	.04	.5	96
	Frozen, concentrate, sweetened:																
253	Undiluted, can, 6 fluid ounces.	1 can-----	211--	350	3	1				85	59	.6	50	.24	.11	1.2	245
254	Water added-----	1 cup-----	249--	115	1	Trace				28	20	.2	20	.08	.03	.4	82
	Dehydrated:																
255	Crystals, can, net weight 4 ounces.	1 can-----	114--	430	5	1				103	99	1.1	90	.41	.18	2.0	399
256	Water added-----	1 cup-----	247--	100	1	Trace				24	22	.2	20	.10	.05	.5	92
257	Grapes, raw:																
	American type (slip skin), such as Concord, Delaware, Niagara, and Scuppernon.	1 cup-----	153--	70	1	1				16	13	.4	100	.05	.03	.3	4
258	European type (adherent skin), such as Malaga, Muscat, Sultanina (Thompson Seedless), and Flame Tokay.	1 cup-----	160--	100	1	Trace				26	18	.6	150	.08	.04	.4	7
259	Grape juice, bottled-----	1 cup-----	254--	165	1	Trace				42	28	.8		.10	.05	.6	Trace

^a Vitamin A value is based on deeply colored yellow varieties.

TABLE 36—Continued

	Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids				Carbohydrate	Calcium	Iron	Vitamin A value	Thiamine	Riboflavin	Niacin	Ascorbic acid
						Saturated (total)	Unsaturated		Lino- leic								
							Oleic										
FRUITS—Continued																	
260	Lemons, raw, medium, 2½-inch-diameter, size 150.	Per cent	Calo- ries	Grams	Grams	Grams	Grams	Grams	Grams	Milli-grams	Milli-grams	Milli-grams	Inter- national Units	Milli-grams	Milli-grams	Milli-grams	Milli-grams
	Lemon juice:																
261	Fresh..... 1 cup.....	91	60	1	Trace	Trace	Trace	Trace	20	17	.5	40	.08	.03	.2	113	
262	1 tablespoon.....	91	5	Trace	Trace	Trace	Trace	Trace	1	1	Trace	Trace	Trace	Trace	Trace	Trace	7
263	Canned, unsweetened..... 1 cup.....	92	60	1	Trace	Trace	Trace	Trace	19	17	.5	40	.07	.03	.2	102	
	Lemonade concentrate, frozen, sweetened:																
264	Undiluted, can, 6 fluid ounces.	48	430	Trace	Trace	Trace	Trace	Trace	112	9	.4	40	.05	.06	.7	66	
265	Water added..... 1 cup.....	88	110	Trace	Trace	Trace	Trace	Trace	28	2	.1	10	.01	.01	.2	17	
	Lime juice:																
266	Fresh..... 1 cup.....	90	65	1	Trace	Trace	Trace	Trace	22	22	.5	30	.05	.03	.3	80	
267	Canned..... 1 cup.....	90	65	1	Trace	Trace	Trace	Trace	22	22	.5	30	.05	.03	.3	52	
	Limeade concentrate, frozen, sweetened:																
268	Undiluted, can, 6 fluid ounces.	50	405	Trace	Trace	Trace	Trace	Trace	108	11	.7	Trace	.02	.02	.2	262	
269	Water added..... 1 cup.....	89	105	Trace	Trace	Trace	Trace	Trace	27	2	.2	Trace	.01	Trace	Trace	6	
270	Oranges, raw:																
	Navel, California (winter), size 88, 2½-inch-diameter.	85	60	2	Trace	Trace	Trace	Trace	16	49	.5	240	.12	.05	.5	75	
271	Other varieties, 3-inch-diameter.	86	70	1	Trace	Trace	Trace	Trace	18	63	.3	290	.12	.03	.4	66	
	eter.																
	Orange juice:																
	Fresh:																
272	California, Valencia, summer.	88	120	2	1	Trace	Trace	Trace	26	27	.7	500	.22	.06	.9	122	
	Florida varieties:																
273	Early and midseason..... 1 cup.....	90	100	1	Trace	Trace	Trace	Trace	23	25	.5	490	.22	.06	.9	127	
274	Late season, Valencia..... 1 cup.....	88	110	1	Trace	Trace	Trace	Trace	26	25	.5	500	.22	.06	.9	92	
275	Canned, unsweetened..... 1 cup.....	87	120	2	Trace	Trace	Trace	Trace	28	25	1.0	500	.17	.05	.6	100	
	Frozen concentrate:																
276	Undiluted, can, 6 fluid ounces.	58	330	5	Trace	Trace	Trace	Trace	80	69	.8	1,490	.63	.10	2.4	312	

TABLE 36—Continued

277	Water added.....	1 cup.....	248--	88	110	2	Trace	---	---	---	---	27	22	.2	500	.21	.03	.8	112
278	Dehydrated: Crystals, can, net weight 4 ounces.	1 can.....	113--	1	430	6	2	---	---	---	---	100	95	1.9	1,900	.76	.24	3.3	406
279	Water added.....	1 cup.....	248--	88	115	1	Trace	---	---	---	---	27	25	.5	500	.20	.06	.9	108
	Orange and grapefruit juice: Frozen concentrate:																		
280	Undiluted, can, 6 fluid ounces.	1 can.....	209--	59	330	4	1	---	---	---	---	78	61	.8	790	.47	.06	2.3	301
281	Water added.....	1 cup.....	248--	88	110	1	Trace	---	---	---	---	26	20	.2	270	.16	.02	.8	102
282	Papayas, raw, ½-inch cubes..	1 cup.....	182--	89	70	1	Trace	---	---	---	---	18	36	.5	3,190	.07	.08	.5	102
	Peaches: Raw:																		
283	Whole, medium, 2-inch- diameter, about 4 per pound.	1 peach.....	114--	89	35	1	Trace	---	---	---	---	10	9	.5	1,320	.02	.05	1.0	7
284	Sliced.....	1 cup.....	168--	89	65	1	Trace	---	---	---	---	16	15	.8	2,230	.03	.08	1.6	12
	Canned, yellow-fleshed, solids and liquid: Sirup pack, heavy:																		
285	Halves or slices.....	1 cup.....	257--	79	200	1	Trace	---	---	---	---	52	10	.8	1,100	.02	.06	1.4	7
286	Halves, medium, and 2 halves and 2 table- sirup.	1 cup.....	117--	79	90	Trace	Trace	---	---	---	---	24	5	.4	500	.01	.03	.7	3
	Water pack.....	1 cup.....	245--	91	75	1	Trace	---	---	---	---	20	10	.7	1,100	.02	.06	1.4	7
287	Strained.....	1 ounce.....	28--	82	20	Trace	Trace	---	---	---	---	5	2	.2	150	Trace	.01	.2	Trace
	Dried:																		
289	Uncooked.....	1 cup.....	160--	25	420	5	1	---	---	---	---	109	77	9.6	6,240	.02	.31	8.5	28
290	Cooked, unsweetened, 10- 12 halves and 6 table- spoons liquid.	1 cup.....	270--	77	220	3	1	---	---	---	---	58	41	5.1	3,300	.01	.15	4.2	6
	Frozen:																		
291	Carton, 12 ounces.....	1 carton.....	340--	79	265	1	Trace	---	---	---	---	69	20	1.4	1,770	.04	.10	1.8	799
292	Can, 16 ounces.....	1 can.....	454--	79	355	2	Trace	---	---	---	---	92	27	1.8	2,360	.05	.14	2.4	7132
293	Peach nectar, canned.....	1 cup.....	250--	87	115	Trace	Trace	---	---	---	---	31	10	.5	1,070	.02	.05	1.0	1
	Pears:																		
294	Raw, 3 by 2½-inch-dia-me- ter.	1 pear.....	182--	83	100	1	1	---	---	---	---	25	13	.5	30	.04	.07	.2	7
	Canned, solids and liquid: Sirup pack, heavy:																		
295	Halves or slices.....	1 cup.....	255--	80	195	1	1	---	---	---	---	50	13	.5	Trace	.03	.05	.3	4
296	Halves, medium, and 2 halves and 2 tablespoons sirup.	1 cup.....	117--	80	90	Trace	Trace	---	---	---	---	23	6	.2	Trace	.01	.02	.2	2

• Vitamin A value of yellow-fleshed varieties; the value is negligible in white-fleshed varieties. ⁷ Content of frozen peaches with added ascorbic acid; when not added the content is 14 milligrams per 12-ounce carton and 18 milligrams per 16-ounce can.

TABLE 36—Continued

	Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids				Carbohy- drate	Cal- cium	Iron	Vita- min A value	Thia- mine	Ribo- flavin	Nia- cin	Ascor- bic acid
						Satu- rated (total)	Unsaturated		Grams								
							Oleic	Lino- leic									
FRUITS—Continued																	
	Pears, canned, solids and liquid—Continued	Per- cent	Calo- ries	Grams	Grams	Grams	Grams	Grams	Grams	Milli- grams	Milli- grams	Inter- national Units	Milli- grams	Milli- grams	Milli- grams	Milli- grams	Milli- grams
297	Water pack..... 1 cup.....	91	80	Trace	Trace	-----	-----	-----	20	12	0.5	Trace	0.02	0.05	0.3	4	
298	Strained..... 1 ounce.....	84	15	Trace	Trace	-----	-----	-----	4	3	.1	Trace	Trace	.01	.1	Trace	
299	Pear nectar, canned..... 1 cup.....	86	130	1	Trace	-----	-----	-----	33	8	.2	10	.01	.05	Trace	1	
300	Persimmons, Japanese or Kaki, raw, seedless, 2½-inch-diameter..... 1 persimmon.....	79	75	1	Trace	-----	-----	-----	20	6	.4	2,740	.03	.02	.1	11	
	Pineapple:																
301	Raw, diced..... 1 cup.....	85	75	1	Trace	-----	-----	-----	19	22	.4	180	.12	.04	.3	33	
	Canned, sirup pack, solids and liquid:																
302	Crushed..... 1 cup.....	78	205	1	Trace	-----	-----	-----	55	75	1.6	210	.20	.04	.4	23	
303	Sliced, slices and juice... 2 small or 1 large and 2 tablespoons juice.....	78	95	Trace	Trace	-----	-----	-----	26	35	.7	100	.09	.02	.2	11	
304	Pineapple juice, canned..... 1 cup.....	86	120	1	Trace	-----	-----	-----	32	37	1.2	200	.13	.04	.4	22	
305	Plums, all except prunes: Raw, 2-inch-diameter, about 2 ounces..... 1 plum.....	86	30	Trace	Trace	-----	-----	-----	7	10	.3	200	.04	.02	.3	3	
	Canned, sirup pack (Italian prunes):																
306	Plums and juice..... 1 cup.....	79	185	1	Trace	-----	-----	-----	50	20	2.7	560	.07	.06	.9	1	
307	Plums (without pits) and juice..... 3 plums and 2 tablespoons juice.....	79	90	Trace	Trace	-----	-----	-----	25	10	1.3	280	.03	.03	.5	1	
	Prunes, dried:																
	Medium, 50–60 per pound:																
308	Uncooked..... 4 prunes.....	24	70	1	Trace	-----	-----	-----	19	14	1.0	430	.02	.05	.4	1	
309	Cooked, unsweetened, 17–18 prunes and ⅓ cup liquid..... 1 cup.....	65	305	3	1	-----	-----	-----	81	60	4.5	1,850	.08	.19	1.8	3	
310	Canned, strained..... 1 ounce.....	73	25	Trace	Trace	-----	-----	-----	7	8	.4	170	.01	.01	.2	1	
311	Prune juice, canned..... 1 cup.....	80	170	1	Trace	-----	-----	-----	45	34	9.8	.....	.01	.03	1.1	4	
312	Raisins, dried..... 1 cup.....	18	460	4	Trace	-----	-----	-----	124	99	5.6	.....	.18	.13	.9	2	

TABLE 36—Continued

[illegible]

4 Calcium may not be usable because of presence of oxalic acid.

TABLE 36—Continued

Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids				Carbohydrate	Calcium	Iron	Vitamin A value	Thiamine	Riboflavin	Niacin	Ascorbic acid
					Unsaturated			Lino-leic								
					Saturated (total)	Oleic										
GRAIN PRODUCTS—Continued																
Breads—Continued																
Raisin bread:																
334 Loaf, 1-pound, 20 slices—	454—	1 loaf—	35	1,190	30	13	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Grams
335 Slice—	23—	1 slice—	35	60	2	1										
Rye bread:																
American, light (½ rye, ½ wheat):																
336 Loaf, 1-pound, 20 slices—	454—	1 loaf—	36	1,100	41	5	1	2	236	7.3	0	.81	.33		6.4	0
337 Slice—	23—	1 slice—	36	55	2	Trace			12	.4	0	.04	.02		.3	0
338 Pumpernickel, dark, loaf, 1 pound.	454—	1 loaf—	34	1,115	41	5	1	2	241	10.9	0	1.05	.63		5.4	0
White bread, enriched: ⁸																
1 to 2 percent nonfat dry milk:																
339 Loaf, 1-pound, 20 slices—	454—	1 loaf—	36	1,225	39	15	3	9	229	10.9	Trace	1.13	.77		10.4	Trace
340 Slice—	23—	1 slice—	36	60	2	1			12	.6	Trace	.06	.04		.5	Trace
3 to 4 percent nonfat dry milk:																
341 Loaf, 1-pound—	454—	1 loaf—	36	1,225	39	15	3	9	229	11.3	Trace	1.13	.95		10.8	Trace
342 Slice, 20 per loaf—	23—	1 slice—	36	60	2	1			12	.6	Trace	.06	.05		.6	Trace
343 Slice, toasted—	20—	1 slice—	24	60	2	1			12	.6	Trace	.05	.05		.6	Trace
344 Slice, 26 per loaf—	17—	1 slice—	36	45	1	1			9	.4	Trace	.04	.04		.4	Trace
5 to 6 percent nonfat dry milk:																
345 Loaf, 1-pound, 20 slices—	454—	1 loaf—	35	1,245	41	17	4	10	228	11.3	Trace	1.22	.91		11.0	Trace
346 Slice—	23—	1 slice—	35	65	2	1			12	.6	Trace	.06	.05		.6	Trace
White bread, unenriched: ⁸																
1 to 2 percent nonfat dry milk:																
347 Loaf, 1-pound, 20 slices—	454—	1 loaf—	36	1,225	39	15	3	9	229	3.2	Trace	.40	.36		5.6	Trace
348 Slice—	23—	1 slice—	36	60	2	1			12	.2	Trace	.02	.02		.3	Trace
3 to 4 percent nonfat dry milk:																
349 Loaf, 1-pound—	454—	1 loaf—	36	1,225	39	15	3	9	229	3.2	Trace	.31	.39		5.0	Trace
350 Slice, 20 per loaf—	23—	1 slice—	36	60	2	1			12	.2	Trace	.02	.02		.3	Trace
351 Slice, toasted—	20—	1 slice—	24	60	2	1			12	.2	Trace	.01	.02		.3	Trace
352 Slice, 26 per loaf—	17—	1 slice—	36	45	1	1			9	.1	Trace	.01	.01		.2	Trace

353	5 to 6 percent nonfat dry milk:	35	1,245	41	17	4	10	2	228	435	3.2	Trace	.32	.59	4.1	Trace
354	Loaf, 1-pound, 20 slices— 1 loaf-----	35	65	2	1				12	22	.2	Trace	.02	.03	.2	Trace
	Slice----- 1 slice-----															
355	Whole-wheat, graham, entire-wheat bread:	36	1,105	48	14	3	7	4	216	449	10.4	Trace	1.17	1.03	12.9	Trace
356	Loaf, 1-pound, 20 slices-- 1 loaf-----	36	55	2	1				11	23	.5	Trace	.06	.05	.7	Trace
357	Slice----- 1 slice-----	24	55	2	1				11	23	.5	Trace	.05	.05	.7	Trace
358	Toast----- 1 slice-----	6	345	11	4	1	2	1	65	107	3.2	Trace	.19	.26	3.1	Trace
	Breadcrumbs, dry, grated --- 1 cup-----															
	Cakes:															
359	Angel food cake; sector, 2- inch (½ of 8-inch-diameter cake).	32	110	3	Trace				23	2	.1	0	Trace	.05	.1	Trace
360	Chocolate cake, fudge icing; sector, 2-inch (⅙ of 10-inch-diameter layer cake).	24	420	5	14	5	7	1	70	118	.5	° 140	.03	.10	.3	Trace
361	Fruitcake, dark; piece, 2 by 2 by ½ inch.	23	105	2	4	1	2	Trace	17	29	.8	° 50	.04	.04	.3	Trace
362	Gingerbread; piece, 2 by 2 by 2 inches.	30	180	2	7	2	4	Trace	28	63	1.4	50	.02	.05	.6	Trace
	Plain cake and cupcakes, without icing:															
363	Piece, 3 by 2 by 1½ inches. 1 piece-----	27	180	4	5	1	3	Trace	31	85	.2	° 70	.02	.05	.2	Trace
364	Cupcake, 2¾-inch-diameter. 1 cupcake-----	27	130	3	3	1	2	Trace	23	62	.2	° 50	.01	.03	.1	Trace
	eter.															
365	Plain cake and cupcakes, with icing:															
	Sector, 2-inch (⅙ of 10-inch layer cake).	25	320	5	6	2	3	Trace	62	117	.4	° 90	.02	.07	.2	Trace
366	Cupcake, 2¾-inch-diameter. 1 cupcake-----	25	160	3	3	1	1	Trace	31	58	.2	° 50	.01	.04	.1	Trace
367	Pound cake; slice, 2¾ by 3 by ⅝ inch.	19	130	2	7	2	4	1	15	16	.5	° 100	.04	.05	.3	Trace
368	Sponge cake; sector, 2-inch (½ of 8-inch-diameter cake).	32	115	3	2	1	1	Trace	22	11	.6	° 210	.02	.06	.1	Trace
369	Cookies:															
	Plain and assorted, 3-inch-diameter.	5	110	2	3	1	2	Trace	19	6	.2	0	.01	.01	.1	0

⁸ When the amount of nonfat dry milk in commercial white bread is unknown, use values for bread with 3 to 4 percent nonfat dry milk.

⁹ If the fat used in the recipe is butter or fortified margarine, the vitamin A value for chocolate cake with fudge icing will be 520 I.U. per 2-inch sector, item 360; 120 I.U. for fruitcake, item 361; for plain cake without icing, 200 I.U. per piece, item 363; 150 I.U. per cupcake, item 364; for plain cake with icing, 280 I.U. per 2-inch sector, item 365; 140 I.U. per cupcake, item 366; and 300 I.U. for pound cake, item 367.

TABLE 36—Continued

	Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids				Carbohydrate	Calcium	Iron	Vitamin A value	Thiamine	Riboflavin	Niacin	Ascorbic acid
						Unsaturated			Lino-leic								
						Saturated (total)	Oleic										
GRAIN PRODUCTS—Continued																	
	Cookies—Continued	Grams	Calories	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Milligrams	Milligrams	International Units	Milligrams	Milligrams	Milligrams	Milligrams
370	Fig bars, small..... 1 fig bar.....	16	55	1	Trace					12	11	0.2	0	Trace	0.01	0.1	0
371	Corn-cereal mixture (mainly degermed cornmeal), puffed, with added thiamine, niacin, and iron.	28	115	2	1					23	6	1.2		.15	.04	.6	0
	Corn flakes, with added thiamine, niacin, and iron:																
372	Plain..... 1 ounce.....	28	110	2	Trace					24	3	.5		.12	.03	.6	0
373	Presweetened..... 1 ounce.....	28	110	1	Trace					26	3	.4		.12	.01	.5	0
	Corn grits, white, degermed, cooked:																
374	Enriched..... 1 cup.....	242	120	3	Trace					27	2	.7	Trace	.11	.08	1.0	0
375	Unenriched..... 1 cup.....	242	120	3	Trace					27	2	.2	Trace	.04	.01	.4	0
	Cornmeal, white or yellow, dry:																
376	Whole ground..... 1 cup.....	118	420	11	5	1	2	2	2	87	12	2.8	¹⁰ 600	.45	.13	2.4	0
377	Degermed, enriched..... 1 cup.....	145	525	11	2	Trace	1	1	1	114	9	¹¹ 4.2	¹⁰ 430	¹¹ .64	¹¹ .38	¹¹ 5.1	0
378	Corn muffins, made with enriched, degermed cornmeal; muffin, 2¾-inch-diameter.	48	155	4	5	2	2	Trace	Trace	22	79	.9	¹² 170	.10	.15	.8	Trace
	Corn, puffed, presweetened, with added thiamine, riboflavin, niacin, and iron.																
379	Corn and soy shreds, with added thiamine and niacin.	28	110	1	Trace					26	3	.5		.12	.05	.6	0
	Crackers:																
380	Graham..... 4 small or 2 medium.	28	100	5	Trace					21	24	1.2		.19	.04	.6	0
	Saltines, 2 inches square.... 2 crackers.....	14	55	1	1					10	3	.3	0	.04	.02	.2	0
381	Soda, plain:	8	35	1	1					6	2	.1	0	Trace	Trace	.1	0
382	Cracker, 2½ inches square	11	45	1	1					8	2	.1	0	.01	.01	.1	0
383	Oyster crackers..... 10 crackers.....	10	45	1	1					7	2	.1	0	.01	Trace	.1	0
384	Cracker meal..... 1 tablespoon.....	10	45	1	1					7	2	.1	0	.01	Trace	.1	0
385	Doughnuts, cake type..... 1 doughnut.....	32	135	2	7	2	2	2	3	17	23	.4	40	.05	.04	.4	0

TABLE 36—Continued

		1 cup-----	238--	89	105	3	Trace			22	31	18	0	11	:07	1.0	0
387	Farina, cooked; enriched to minimum levels for required nutrients and for the optional nutrient, calcium. Macaroni, cooked: Enriched:																
388	Cooked 8-10 minutes (undergoes additional cooking in a food mixture).	1 cup-----	130--	64	190	6	1			39	14	1.4	0	.23	.14	1.9	0
389	Cooked until tender: Unenriched:	1 cup-----	140--	72	155	5	1			32	11	1.3	0	.19	.11	1.5	0
390	Cooked 8-10 minutes (undergoes additional cooking in a food mixture).	1 cup-----	130--	64	190	6	1			39	14	.6	0	.02	.02	.5	0
391	Cooked until tender: Macaroni, enriched, and cheese, baked.	1 cup-----	140--	72	155	5	1			32	11	.6	0	.02	.02	.4	0
392	Muffins, with enriched white flour; muffin, 2¾-inch-diameter.	1 cup-----	220--	58	475	18	25	14	8	44	394	2.0	970	.22	.46	1.9	Trace
393	Noodles (egg noodles), cooked: Enriched: Unenriched: Oat-cereal mixture, mainly oats, with added B-vitamins and minerals.	1 cup-----	160--	70	200	7	2	1	1	37	16	1.4	60	.23	.14	1.8	0
394	Oatmeal or rolled oats, regular or quick-cooking, cooked.	1 cup-----	160--	70	200	7	2	1	1	37	16	1.0	60	.04	.03	.7	0
395	Pancakes (griddlecakes), 4-inch-diameter:	1 ounce-----	28--	3	115	4	2	Trace	1	21	45	1.2	0	.22	.04	.5	0
396	Wheat, enriched flour (home recipe).	1 cup-----	236--	85	150	5	3	1	1	26	21	1.7	0	.22	.05	.4	0
397	Buckwheat (buckwheat pancake mix).	1 cake-----	27--	53	60	2	2	Trace	1	8	34	.3	30	.05	.06	.3	Trace
398	Piecrust, plain, baked: Enriched flour:	1 cake-----	27--	62	45	2	2	1	1	6	67	.3	30	.04	.04	.2	Trace
399	Lower crust, 9-inch shell.	1 crust-----	135--	10	655	10	36	8	24	72	15	2.7	0	.29	.23	3.0	0
400	Double crust, 9-inch pie.	1 double crust--	270--	10	1,315	20	73	17	47	143	30	5.4	0	.58	.47	5.9	0
401	Unenriched flour:																
402	Lower crust, 9-inch shell.	1 crust-----	135--	10	655	10	36	8	24	72	15	.7	0	.05	.03	.7	0
403	Double crust, 9-inch pie.	1 double crust--	270--	10	1,315	20	73	17	47	143	30	1.4	0	.09	.06	1.4	0

¹⁰ Vitamin A value based on yellow cornmeal; white cornmeal contains only a trace.

¹¹ Iron, thiamine, riboflavin, and niacin are based on the minimal level of enrichment specified in standards of identity promulgated under the Federal Food, Drug, and Cosmetic Act.

¹² Based on recipe using white cornmeal; if yellow cornmeal is used the vitamin A value is 240 I.U.

TABLE 36—Continued

	Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids			Carbohydrate	Calcium	Iron	Vitamin A value	Thiamine	Riboflavin	Niacin	Ascorbic acid
						Saturated (total)	Unsaturated	Linoleic								
				Grams	Grams	Grams	Grams	Grams	Grams	Grams	Grams	International Units	Milligrams	Milligrams	Milligrams	Milligrams
GRAIN PRODUCTS—Continued																
Pies; sector, 4-inch, 1/4 of 9-inch-diameter pie:																
404	Apple.....	135	330	3	13	4	7	1	53	9	0.5	220	0.04	0.02	0.3	1
405	Cherry.....	135	340	3	13	4	7	1	55	14	.5	520	.04	.02	.3	2
406	Custard.....	130	265	7	11	4	6	1	34	162	1.6	290	.07	.21	.4	0
407	Lemon meringue.....	120	300	4	12	4	6	1	45	24	.6	210	.04	.10	.2	1
408	Mince.....	135	340	3	9	2	6	1	62	22	3.0	10	.09	.05	.5	1
409	Pumpkin.....	130	265	5	12	5	6	1	34	70	1.0	2,480	.04	.15	.4	0
410	Pizza (cheese), 5 1/2-inch sector, 1/4 of 14-inch-diameter pie.	75	180	8	6	3	3	Trace	23	157	.7	570	.03	.09	.8	8
411	Popcorn, popped.....	14	55	2	1	---	---	---	11	2	.4	0	.05	.02	.3	0
412	Pretzels, small stick.....	5	20	Trace	Trace	---	---	---	4	1	0	0	Trace	Trace	Trace	0
Rice, cooked:																
413	Parboiled.....	176	205	4	Trace	---	---	---	45	14	.5	0	.10	.02	1.9	0
414	White.....	168	200	4	Trace	---	---	---	44	13	.5	0	.02	.01	.7	0
415	Rice, puffed, with added thiamine, niacin, and iron.	14	55	1	Trace	---	---	---	12	2	.3	---	.06	.01	.6	0
416	Rice flakes, with added thiamine and niacin.	30	115	2	Trace	---	---	---	26	9	.5	---	.11	.01	1.7	0
Rolls:																
Plain, pan; 12 per 16 ounces:																
417	Enriched.....	38	115	3	2	1	1	Trace	20	28	.7	Trace	.11	.07	.8	Trace
418	Unenriched.....	38	115	3	2	1	1	Trace	20	28	.3	Trace	.02	.03	.3	Trace
419	Hard, round; 12 per 22 ounces.	52	160	5	2	1	1	Trace	31	24	.4	Trace	.03	.05	.4	Trace
420	Sweet, pan; 12 per 18 ounces.	43	135	4	4	1	2	Trace	21	37	.3	30	.03	.06	.4	0
421	Rye wafers, 1 1/8 by 3 1/2 inches.	13	45	2	Trace	---	---	---	10	6	.6	0	.04	.03	.2	0
Spaghetti, cooked until tender:																
422	Enriched.....	140	155	5	1	---	---	---	32	11	1.3	0	.19	.11	1.5	0
423	Unenriched.....	140	155	5	1	---	---	---	32	11	.6	0	.02	.02	.4	0

TABLE 36—Continued

424	Spaghetti with meat sauce.....	1 cup.....	250..	76	285	13	10	3	3	3	3	35	25	2.0	690	.07	.10	2.1	13
425	Spaghetti in tomato sauce with cheese.	1 cup.....	250..	80	210	6	5	2	1	2		36	45	1.0	830	.07	.08	1.0	15
426	Waffles, with enriched flour, ½ by 4½ by 5½ inches.	1 waffle.....	75..	34	240	8	9	3	5	1		30	124	1.4	310	.14	.21	1.1	Trace
427	Wheat, puffed: With added thiamine, niacin, and iron.	1 ounce.....	28..	4	100	4	Trace					22	8	1.2	0	.16	.06	2.2	0
428	With added thiamine and niacin; presweetened.	1 ounce.....	28..	3	105	1	Trace					26	4	.5	0	.12	.01	1.4	0
429	Wheat, rolled; cooked.....	1 cup.....	236..	80	175	5	1					40	19	1.7	0	.17	.06	2.1	0
430	Wheat, shredded, plain (long, round, or bite-size).	1 ounce.....	28..	6	100	3	1					23	13	1.0	0	.06	.03	1.3	0
431	Wheat and malted barley cereal, with added thiamine, niacin, and iron.	1 ounce.....	28..	3	105	3	Trace					24	13	1.0	0	.13	.05	1.5	0
432	Wheat flakes, with added thiamine, niacin, and iron.	1 ounce.....	28..	4	100	3	Trace					23	13	1.2	0	.16	.05	1.8	0
433	Wheat flours: Whole-wheat, from hard wheats, stirred.	1 cup.....	120..	12	400	16	2	Trace	1	1		85	49	4.0	0	.66	.14	5.2	0
434	All-purpose or family flour: Enriched, sifted.....	1 cup.....	110..	12	400	12	1					84	18	11 3.2	0	11.48	11.29	11 3.8	0
435	Unenriched, sifted.....	1 cup.....	110..	12	400	12	1					84	18	.9	0	.07	.05	1.0	0
436	Self-rising: Enriched.....	1 cup.....	110..	12	385	10	1					81	299	11 3.2	0	11.48	11.29	11 3.8	0
437	Unenriched.....	1 cup.....	110..	12	385	10	1					81	299	1.1	0	.08	.05	1.3	0
438	Wheat germ, stirred.....	1 cup.....	68..	11	245	17	7	1	2	3		34	57	5.5	0	1.39	.54	3.1	0
FATS, OILS																			
Butter, 4 sticks per pound:																			
439	Sticks, 2.....	1 cup.....	224..	16	1,605	1	181	100	60	5		1	45	Trace	13 7,400				0
440	Stick, ½.....	1 tablespoon..	14..	16	100	Trace	11	6	4	Trace		Trace	3	Trace	13 460				0
441	Pat or square (64 per pound).	1 pat.....	7..	16	50	Trace	6	3	2	0		Trace	1	Trace	13 230				0
Fats, cooking:																			
442	Lard.....	1 cup.....	220..	0	1,985	0	220	84	101	22		0	0	0	0	0	0	0	0
443	1 tablespoon..	1 tablespoon..	14..	0	135	0	14	5	6	1		0	0	0	0	0	0	0	0
444	Vegetable fats.....	1 cup.....	200..	0	1,770	0	200	46	130	14		0	0	0	0	0	0	0	0
445	1 tablespoon..	1 tablespoon..	12.5..	0	110	0	12	3	8	1		0	0	0	0	0	0	0	0

¹¹ Iron, thiamine, riboflavin, and niacin are based on the minimal level of enrichment specified in the standards of identity promulgated under the Federal Food, Drug, and Cosmetic Act. ¹³ Year-round average.

TABLE 36—Continued

	Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids			Carbohydrate	Calcium	Iron	Vitamin A value	Thiamine	Riboflavin	Niacin	Ascorbic acid
						Unsaturated										
						Saturated (total)	Unsaturated									
							Oleic	Linoleic								
FATS, OILS—Continued																
	Margarine, 4 sticks per pound:	Grams	Calories	Grams	Grams	Grams	Grams	Grams	Grams	Milligrams	International Units	Milligrams	Milligrams	Milligrams	Milligrams	Milligrams
446	Sticks, 2.....	224	1,615	1	181	47	103	16	1	45	Trace	14,400				0
447	Stick, 1/8.....	14	100	Trace	11	3	6	1	Trace	3	Trace	14,460				0
448	Pat or square (64 per pound).	7	50	Trace	6	1	3	1	Trace	1	Trace	14,230				0
Oils, salad or cooking:																
449	Corn.....	14	125	0	14	1	4	7	0	0	0		0	0	0	0
450	Cottonseed.....	14	125	0	14	3	3	7	0	0	0		0	0	0	0
451	Olive.....	14	125	0	14	2	11	1	0	0	0		0	0	0	0
452	Soybean.....	14	125	0	14	2	3	7	0	0	0		0	0	0	0
Salad dressings:																
453	Blue cheese.....	16	90	1	10	2	2	5	1	11	Trace	30	Trace	.02	Trace	Trace
454	Commercial, plain; mayonnaise type.	15	60	Trace	6	1	1	3	2	2	Trace	30	Trace	Trace	Trace	0
455	French.....	15	60	Trace	6	1	1	3	2	3	.1	0	0	0	0	0
456	Home cooked, boiled.....	17	30	1	2	1	1	Trace	3	15	.1	80	.01	.03	Trace	Trace
457	Mayonnaise.....	15	110	Trace	12	2	3	6	Trace	2	.1	40	Trace	Trace	Trace	0
458	Thousand Island.....	15	75	Trace	8	1	2	4	1	2	.1	60	Trace	Trace	Trace	1
SUGARS, SWEETS																
Candy:																
459	Caramels.....	28	120	1	3	2	1	Trace	22	36	.7	50	.01	.04	Trace	Trace
460	Chocolate, sweetened, milk.	28	145	2	9	5	3	Trace	16	61	.3	40	.03	.11	.2	0
461	Fudge, plain.....	28	115	Trace	3	2	1	Trace	23	14	.1	60	Trace	.02	Trace	Trace
462	Hard candy.....	28	110	0	0				28	0	0	0	0	0	0	0
463	Marshmallow.....	28	90	1	0				23	0	0	0	0	0	0	0
464	Chocolate sirup.....	20	40	Trace	Trace				11	3	.3					
465	Honey, strained or extracted..	21	60	Trace	0				17	1	.2	0	Trace	.01	Trace	1
466	Jams, marmalades, preserves..	20	55	Trace	Trace				14	2	.1	Trace	Trace	Trace	Trace	1
467	Jellies.....	20	50	0	0				13	2	.1	Trace	Trace	Trace	Trace	1

TABLE 36--Continued

[illegible]

¹⁴ Based on the average vitamin A content of fortified margarine. Federal specifications for fortified margarine require a minimum of 15,000 I.U. of vitamin A per pound.

¹⁵ Calcium value is based on dark brown sugar; value is lower for light brown sugar.

¹⁶ The value excluding energy derived from alcohol is 48 calories. If the energy from alcohol is considered available, the value is 114 calories.

TABLE 36—Continued

	Food, approximate measure, and weight (in grams)	Water	Food energy	Protein	Fat (total lipid)	Fatty acids			Carbohydrate	Calcium	Iron	Vitamin A value	Thiamine	Riboflavin	Niacin	Ascorbic acid
						Unsaturated		Lino- leic								
						Saturated (total)	Oleic									
			Calo- ries	Grams	Grams	Grams	Grams	Grams	Milli- grams	Milli- grams	Milli- grams	Inter- national Units	Milli- grams	Milli- grams	Milli- grams	Milli- grams
MISCELLANEOUS ITEMS—Continued																
	Pickles, cucumber:	Grams														
491	Dill, large, 4 by 1¾ inches..	135	15	1	Trace				3	34	1.6	420	Trace	0.09	0.1	8
492	Sweet, 2¾ by ¾ inch.....	20	20	Trace	Trace				5	3	.3	20	0	Trace	Trace	1
	Popcorn. See Grain Products.															
493	Sherbet, factory packed.....	193	235	3	Trace				58	96	.1	0	.03	.15	.1	0
	Soups, canned; ready-to-serve:															
494	Bean.....	250	190	8	5	2	2	Trace	30	95	2.8		.10	.10	.8	
495	Beef.....	250	100	6	4	2	2	Trace	11	15	.5					
496	Bouillon, broth, consommé..	240	10	2					0	2	1.0	0	0	.05	.6	0
497	Chicken.....	250	75	4	2	1	1	Trace	10	20	.5		.02	.12	1.5	
498	Clam chowder.....	255	85	5	2	Trace	Trace	1	12	36	3.6					
499	Cream soup (asparagus, cel- ery, mushroom).	255	200	7	12	7	4	Trace	18	217	.5	200	.05	.20	.1	0
500	Noodle, rice, barley.....	250	115	6	4	1	2	1	13	82	.2	30	.02	.05	.7	0
501	Pea.....	245	140	6	2	1	1	Trace	25	32	1.5	440	.17	.07	1.2	5
502	Tomato.....	245	90	2	2	1	Trace	1	18	24	1.0	1,230	.02	.10	.7	10
503	Vegetable.....	250	80	4	2	1	1	Trace	14	32	.8		.05	.08	1.0	8
504	Starch, pure, including arrow- root, corn, etc.	128	465	1	Trace				111	0	0	0	0	0	0	0
505			30	Trace	Trace				7	0	0	0	0	0	0	0
506	Tapioca, quick-cooking granu- lated, dry; stirred before measuring.	152	545	1	Trace				131	18	1.5	0	0	0	0	0
507		10	35	Trace	Trace				8	1	.1	0	0	0	0	0
508	Vinegar.....	15	2	0					1	1	.1					
509	White sauce, medium.....	265	430	10	33	18	11	1	23	305	.3	1,350	.07	.42	.3	1
	Yeast:															
	Baker's:															
510	Compressed.....	28	25	3	Trace				3	4	1.4	Trace	.20	.47	3.2	Trace
511	Dry active.....	28	80	10	Trace				11	12	4.6	Trace	.66	1.53	10.4	Trace
512	Brewer's, dry.....	8	25	3	Trace				3	17	1.4	Trace	1.25	.34	3.0	Trace
	Yoghurt. See Milk, Cream, Cheese; Related Products.															

TABLE 36a
YIELD OF COOKED MEAT PER POUND OF RAW MEAT

Meat as purchased	Yield of cooked meat (without drippings)	
	Description	Approximate weight per pound of raw meat
Chops or steaks for broiling or frying:		<i>Ounces</i>
With bone and relatively large amount of fat, such as: Pork or lamb chops; beef rib, sirloin, or porterhouse steaks.	With bone and fat.....	10-12
	Without bone, with fat.....	7-10
	Lean only.....	5-7
Without bone and with very little fat, such as: Round of beef; veal steaks.	Lean and fat.....	12-13
	Lean only.....	9-12
Ground meat for broiling or frying, market type, such as: Hamburger; lamb or pork patties.	Patties.....	9-13
Roasts for oven cooking (no liquid added):		
With bone and relatively large amount of fat, such as: Beef rib, loin, chuck; lamb shoulder, leg; pork, fresh or cured.	With bone and fat.....	10-12
	Without bone, with fat.....	8-10
	Lean only.....	6-9
Without bone.....	Lean and fat.....	10-12
	Lean only.....	7-10
Cuts for pot-roasting, simmering, braising, stewing:		
With bone and relatively large amount of fat, such as: Beef chuck; pork shoulder.....	With bone and fat.....	10-11
	Without bone, with fat.....	8-9
	Lean only.....	6-8
Without bone and with relatively small amount of fat, such as: Trimmed beef; veal.....	Lean with small amount of adhering fat.....	9-11

APPENDIX 3

SPECIFIC ENERGY FACTORS FOR CALCULATING CALORIC VALUES OF FOODS

TABLE 37

FOOD OR FOOD GROUP	PHYSIOLOGICAL ENERGY FACTORS TO BE APPLIED TO THE NUTRIENTS IN FOODS*		
	Protein (Calories per Gram)	Fat (Calories per Gram)	Carbohy- drate (by Difference) (Calories per Gram)
Milk, milk products.....	4.27	8.79	3.87
Meat, fish.....	4.27	9.02	†
Eggs.....	4.36	9.02	3.68
<i>Separated fats:</i>			
butter fat.....		8.79	.....
other animal fats.....		9.02	.....
vegetable fats and oils, hydrogen- ated fats.....		8.84	.....
<i>Cereals:</i>			
barley, light.....	3.55	8.37	3.95
corn meal, whole ground.....	2.73	8.37	4.03
corn meal, degermed.....	3.46	8.37	4.16
crackers, soda, plain.....	4.23	8.37	4.12
macaroni.....	3.91	8.37	4.12
noodles (with egg).....	3.91	8.80	4.12
oatmeal, rolled oats.....	3.55	8.37	4.07
rice, polished.....	3.82	8.37	4.16
rye flour, whole grain.....	3.05	8.37	3.86
wheat, 97-100% extraction.....	3.59	8.37	3.78
wheat, 85-93% extraction.....	3.78	8.37	3.95
wheat, 70-74% extraction.....	4.05	8.37	4.12
other cereals, refined.....	3.87	8.37	4.12
<i>Other foods:</i>			
dry beans, peas, nuts.....	3.47	8.37	4.07†
potatoes and starchy roots.....	2.74	8.37	4.03
other underground crops§.....	2.74	8.37	3.84
other vegetables.....	2.44	8.37	3.57
lemons, lemon juice.....	3.36	8.37	2.70
other fruits.....	3.36	8.37	3.60
sugar:			
disaccharide.....			3.87
glucose.....			3.68

* Based on data from William Olin Atwater, *12th Annual Report of Storrs (Connecticut) Agricultural Experiment Station, 1899*, pp. 69-110, and from more recent compilations made by the Bureau of Human Nutrition and Home Economics, U.S. Department of Agriculture.

† Brain, heart, kidney, liver, 3.87 calories per gram; tongue, shellfish, fish products, 4.11 calories per gram.

‡ Soybeans and soya products, 1.68 calories per gram.

§ Vegetables such as beets, carrots, onions, parsnips, or radishes.

APPENDIX 4

DIETARY ANALYSIS OF SOME COMMON ALCOHOLIC BEVERAGES

TABLE 38*

FOOD	WT. (Gm.)	APPROXIMATE MEASURE	CAL- ORIES	PRO- TEIN (Gm.)	ALCO- HOL (Gm.)	CHO (Gm.)	Ca (Mg.)	P (Mg.)	Fe (Mg.)	VITAMINS						APPROX. EXCESS		FI- BER (Gm.)
										A (I.U.)	Thia- mine (mcg.)	Ribo- flavin (mcg.)	Nia- cin (Mg.)	Ascor- bic Acid (Mg.)	D (I.U.)	Acid	Base	
Ale, mild.....	230	1 large glass, 8 oz.	100	1.1	8.9	8.0	30	41	0.2	(0)	Tr.	(69)	(0.5)	0	0	.....	.....	.....
Ale, mild.....	345	1 bottle, 12 oz.	148	1.7	13.1	12.0	45	62	0.3	(0)	Tr.	(102)	(0.7)	0	0	.....	.....	.....
Beer, average.....	240	1 large glass, 8 oz.	114	1.4	8.9	10.6	10	62	0.0	(0)	Tr.	72	0.5	0	0	.....	.....	.....
Beer, average.....	360	1 bottle, 12 oz.	173	2.2	13.3	15.8	14	94	0.0	(0)	Tr.	108	0.7	0	0	.....	.....	.....
Brandy, California.....	30	1 brandy glass	75	.....	10.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brandy, cognac.....	30	1 brandy glass	75	.....	10.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cider, fermented.....	180	1 glass, 6 oz.	73	.....	9.4	1.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cordials, liqueurs as:																		
Anisette.....	20	1 cordial glass	75	.....	7.0	7.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
apricot brandy.....	20	1 cordial glass	65	.....	6.0	6.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Benedictine.....	20	1 cordial glass	70	.....	6.6	6.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
crème de menthe.....	20	1 cordial glass	68	.....	6.0	7.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Curacao.....	20	1 cordial glass	55	.....	6.0	4.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Daiquiri.....	.....	1 cocktail	124	0.1	15.1	5.2	4	3	0.1	.....	14	1	Tr.	8	0	.....	.....	.....
Eggnog, Christmas type.....	123	1 punch cup	338	3.9	15.0	18.0	44	74	0.7	84	35	113	Tr.	Tr.	21	2.5	.....	.....
Gin, dry.....	43	1 jigger, 1½ oz.	107	Tr.	15.1	.....	.....	.....	Tr.	.....	7	Tr.	Tr.	4	0	.....	.....	.....
Gin rickey.....	.....	1 glass	153	.....	21.0	1.3	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Highball.....	.....	1 glass	170	.....	24.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Manhattan.....	.....	1 cocktail	167	Tr.	19.2	7.9	1	1	Tr.	35	36	Tr.	Tr.	(0)	0	.....	.....	.....
Martini.....	.....	1 cocktail	143	0.1	18.5	0.3	5	1	0.1	4	Tr.	Tr.	Tr.	(0)	0	.....	.....	.....
Mint julep.....	.....	1 glass	217	.....	29.2	2.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Old Fashioned.....	.....	1 glass	183	.....	24.0	3.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Planter's Punch.....	.....	1 glass	177	0.1	21.5	7.9	4	3	0.1	.....	14	1	Tr.	8	0	.....	.....	.....
Rum.....	43	1 jigger, 1½ oz.	107	.....	15.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rum sour.....	.....	1 glass	163	0.2	21.0	3.7	4	4	Tr.	.....	20	Tr.	Tr.	14	0	.....	.....	.....
Tom Collins.....	.....	1 cocktail	182	0.3	21.5	9.0	6	6	Tr.	0	30	Tr.	Tr.	21	0	.....	.....	.....
Whiskey, rye.....	43	1 jigger, 1½ oz.	122	.....	17.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Whiskey, Scotch.....	43	1 jigger, 1½ oz.	107	.....	15.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wine, California, red.....	100	1 wine glass	73	0.2	10.0	0.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wine, California, sauterne.....	100	1 wine glass	85	0.2	10.5	4.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wine, champagne, domestie.....	100	1 wine glass	85	0.2	11.0	3.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wine, muscatelle or port.....	100	1 wine glass	160	0.2	15.0	14.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wine, vermouth, French.....	100	1 wine glass	108	.....	15.0	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wine, vermouth, Italian.....	100	1 wine glass	170	.....	18.0	12.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Reprinted from: Anna dePlanter Bowes, *Food Values of Portions Commonly Used* (7th ed.; Philadelphia: Anna dePlanter Bowes [Northeast Corner, 7th and Delancey Streets, Philadelphia 6], 1951), p. 9.

NOTE: Data on alcoholic beverages have been enlarged by request from many people to include some popular cocktails. The recipes used for these mixed drinks were taken from published regulation ones for bartenders. There may be many deviations from the standard recipes. In computing the calories it was assumed that energy from alcohol is available. It was computed on the basis of 7.1 calories per gram of alcohol.

APPENDIX 5

CHOLESTEROL, FAT, AND FATTY ACID CONTENT OF FOODS

TABLE 39
CHOLESTEROL CONTENT OF FOOD SAMPLES*

Food	Total Cholesterol (Gm/100 Gm Moist Weight)
<i>Muscle meats:</i>	
Beef round (medium fat).....	0.125
Beef round (lean).....	0.095
Veal shank.....	0.14
Veal breast.....	0.10
Pork spareribs.....	0.105
<i>Variety meats:</i>	
<i>Liver:</i>	
Lamb (4 samples).....	0.61
Pork.....	0.42
Beef.....	0.32
Calf (4 samples).....	0.36
Tripe.....	0.15
Sweetbreads.....	0.28
<i>Shellfish:</i>	
Oysters, eastern†.....	0.23
Oysters, California I†.....	0.28
Oysters, California II†.....	0.47
Crab†.....	0.145
<i>Cheeses:</i>	
American.....	0.16
American, processed.....	0.155
Swiss, processed.....	0.145
Monterey Jack.....	0.19
Velveeta.....	0.16
Limburger, processed.....	0.135
Pimento cream, processed.....	0.14
Butter.....	0.28
Egg yolk, dried.....	3.9
Egg yolk, fresh.....	2.0
Primex†.....	0.15
Brewer's yeast, dry†.....	0.68
Casein, raw.....	0.065
Milk, whole fluid (4 per cent fat)....	0.009-0.013
Milk powder, skim (1 per cent fat) ..	0.004
Milk, skim fluid (1 per cent fat).....	0.0004

* R. Okey, Cholesterol content of foods, J. Am. Dietet. A., 21: 341-44, 1945; B. Nataf, O. Mickelsen, A. Keys, and W. E. Petersen; The cholesterol content of cow's milk, J. Nutrition, 36:495-506, 1948; W. Lange, Cholesterol, phytosterol, and tocopherol content of food products and animal tissues, J. Am. Oil Chem. Soc., 27:414-22, 1950.

† Total digitonin precipitable sterol. These foods are known to contain sterols other than cholesterol.

TABLE 40
CHOLESTEROL CONTENT OF SUBSTANCES
USED AS FOODS*

Food	Total Cholesterol (Gm/100 Gm Moist Weight)
<i>Organs:</i>	
Beef brain.....	2.36; 2.11
Beef heart.....	0.15; 0.14
Beef kidney.....	0.40; 0.41
Beef liver.....	0.26; 0.19
Beef lung.....	0.39; 0.35
Beef thymus (sweetbread)...	0.25; 0.22
<i>Heart muscle:</i>	
Rabbit.....	0.20
"Av. mammal".....	0.18
Hen.....	0.16
Pigeon.....	0.16
Duck, wild.....	0.16
Turtle.....	0.16
<i>Skeletal muscle:</i>	
Beef.....	0.06
Lamb.....	0.07
Pork.....	0.06
Rabbit, laboratory.....	0.05
Rabbit, wild.....	0.08
Veal.....	0.065
"Av. mammal".....	0.087
Chicken, light.....	0.09
Chicken, dark.....	0.06
Hen.....	0.07
Duck.....	0.07
Pigeon.....	0.11
Codfish.....	0.05
Frog.....	0.04
Salmon.....	0.06
Shrimp.....	0.15
Turtle.....	0.06; 0.07
<i>Eggs (hen's):</i>	
Frozen whole.....	0.56
Frozen yolk.....	1.33
Liquid whole.....	0.518
Dehydrated whole.....	2.14
Dehydrated yolk.....	2.81
Fresh whole.....	0.468

* Recomputed by Okey (Cholesterol content of food, J. Am. Dietet. A., 21: 341-44, 1945) to approximate raw-food bases from dry-weight figures given in recent papers.

TABLE 41*—FAT, FATTY ACID, AND CHOLESTEROL CONTENT OF FOODS

Food†	PORTION		CALO-RIES	PRO-TEIN	FAT	CARBO-HY-DRATE	TOTAL FATTY ACIDS		UNSATURATED FATTY ACIDS				CHOLES-TEROL
	Amount	Weight (Gm.)					Satu-rated (Gm.)	Unsatu-rated (Gm.)	Oleic (Gm.)	Lino-leic (Gm.)	Lino-lenic (Gm.)	Arachi-donic (Gm.)	
Cereals and Bread Products‡													
Cereals, cooked:													
barley, whole.....	1 c.	30 (dry)	100	3.6	0.6	20	0.07	0.50	0.19	0.31	Trace		
cornmeal, not degermed.....	1 c.	20 (dry)	71	1.8	0.7	15	0.08	0.59	0.31	0.28			
millet.....	1 c.	30 (dry)	98	3.0	0.9	22	0.10	0.75	0.21	0.50			
oats, rolled.....	1 c.	20 (dry)	74	3.0	1.5	13	0.28	1.14	0.50	0.61			
rice, brown.....	1 c.	40 (dry)	240	3.0	0.7	31	0.20	0.54	0.31	0.22			
wheat, whole.....	1 c.	30 (dry)	100	3.8	0.6	21	0.10	0.47	0.14	0.27			
Cereals, ready-to-eat:													
bran flakes.....	1 c.	35	125	3.8	0.6	28	0.10	0.47	0.14	0.27			
oat cereal.....	1 c.	25	100	3.6	1.8	18	0.34	1.36	0.60	0.73			
popcorn, plain.....	1 c.	14	54	1.8	0.7	11	0.08	0.58	0.30	0.28			
shredded wheat.....	1 c.	30	100	2.9	0.7	23	0.11	0.55	0.17	0.32			
Breadstuffs:§													
white bread (L).....	1 sl.	23	64	1.9	0.8	12	0.29	0.47	0.32	0.12	0.01		1
white bread (VF).....	1 sl.	23	64	1.9	0.8	12	0.17	0.59	0.43	0.12	0.01		
whole wheat, 100% (L).....	1 sl.	23	55	2.1	0.6	11	0.20	0.37	0.23	0.11	0.01		
whole wheat, 100% (VF).....	1 sl.	23	55	2.1	0.6	11	0.13	0.47	0.30	0.11	0.01		
corn bread or muffin (MF)	1 pc.	70	153	4.7	3.3	26	1.46	1.67	1.22	0.37	0.02	0.02	33
corn bread or muffin (VF).....	1 pc.	70	153	4.7	3.3	26	1.10	2.00	1.51	0.37	0.02	0.02	32
baking powder biscuits (L).....	2	78	258	6.1	8.0	40	3.30	4.30	3.34	0.60	0.01	0.01	9
baking powder biscuits (MF).....	2	78	258	6.1	8.0	40	3.80	3.80	3.12	0.46	0.01	0.01	7
baking powder biscuits (VF).....	2	78	258	6.1	8.0	40	2.13	5.47	4.56	0.60	0.01	0.01	3
coffee cake, rich (L) butter and sugar topping.....	1 pc.	70	265	2.4	17.0	35	7.75	8.40	6.62	1.00	0.02	0.06	43
coffee cake, rich (VF) butter and sugar topping.....	1 pc.	70	265	2.4	17.0	35	3.88	12.27	10.32	1.30	0.02	0.02	21
cracker, Graham (L) 65/lb.....	2	14	55	1.1	1.4	10	0.56	0.77	0.61	0.10			1
cracker, Graham (VF) 65/lb.....	2	14	55	1.1	1.4	10	0.34	1.06	0.86	0.09			
cracker, soda (L) 80/lb.....	2	11	47	1.1	1.1	8	0.44	0.60	0.48	0.10			1
cracker, soda (VF) 80/lb.....	2	11	47	1.1	1.1	8	0.25	0.79	0.68	0.08			
muffins, plain (L).....	2 1/4 in.	48	134	3.8	4.0	20	1.67	2.13	1.75	0.34	0.01	0.01	27
muffins, plain (MF).....	2 1/4 in.	48	134	3.8	4.0	20	1.90	1.90	1.52	0.30	0.01	0.01	26
muffins, plain (VF).....	2 1/4 in.	48	134	3.8	4.0	20	1.18	2.62	2.13	0.34	0.01	0.01	23

* From M. G. Hardinge and H. Crooks, Fatty acid composition of food fats, J. Am. Dietet. A., 34:1065-71, 1958.

† The letters in this column have the following meanings:
MF—Mixed hydrogenated animal and vegetable shortening.
VF—Hydrogenated vegetable shortening.

M—Vegetable margarine.
B—Butter.
L—Lard.

‡ Foods with minimal fat content omitted.
§ Fatty acid values computed from iodine value.

TABLE 41—Continued

Food†	Portion		Calo-ries	Pro-tein	Fat	CARBO-HY-DRATE	TOTAL FATTY ACIDS		UNSATURATED FATTY ACIDS				CHOLESTEROL	
	Amount	Weight (Gm.)					Saturated (Gm.)	Unsaturated (Gm.)	Oleic (Gm.)	Lino-leic (Gm.)	Lino-lenic (Gm.)	Arachi-donic (Gm.)		
														(Mg.)
Dairy Products														
Cheese, American process.....	1 oz.	28	105	6.6	8.5	1	4.84	3.23	2.50	0.26	.....	0.08	44
	1 oz.	28	106	2.6	10.5	1	6.16	4.10	3.18	0.37	.....	0.01	36
Cream: light, 20% fat.....	1 Tbsp.	15	30	0.4	3.0	1	1.71	1.14	0.88	0.10	.....	0.03	10
	1 Tbsp.	15	49	0.3	5.2	0.5	2.96	1.98	1.53	0.18	.....	0.05	18
	1	50	77	6.1	5.5	0.3	1.67	3.56	2.09	1.15	0.16	0.10	234	
Milk: cow's, whole.....	1 c.	244	166	8.5	9.5	12	5.42	3.61	2.80	0.33	.....	0.09	34
	½ c.	60	82	1.9	7.2	3	4.10	2.74	2.12	0.25	.....	0.07	25
	3¼ oz.	100	100	4.0	7.5	4.7	4.13	3.00	2.57	0.07	.....	0.07	.....
	3¼ oz.	100	64	3.9	2.8	5.6	1.60	1.06	0.88	0.01	.....	.....	.....
	3¼ oz.	100	73	3.8	4.5	4.5	2.95	1.33	0.86	0.06	.....	0.17	.....
	3¼ oz.	100	70	1.5	3.3	6.5	1.50	1.63	1.16	0.25	.....	0.09	.....
3¼ oz.	100	100	5.8	6.5	4.5	4.08	2.10	1.73	0.03	.....	0.06	.....	
Dairy Food Substitutes¶														
Soybean milk, commercial type: reconstituted or liquid.....	1 c.	244	152	7.8	8.6	13	1.05	7.03	2.26	4.28	0.48	.....	.....
	½ sl.	70	63	9.5	4.8	1.9	0.77	3.78	1.96	1.69	0.11	.....	.....
Soybean cheese—"Vege Chee" ..														
Desserts and Sweets#														
Apple Brown Betty (B), (L) in bread crumbs.....	½ c.	115	172	2.0	3.3	35	1.76	1.38	1.03	0.20	Trace	0.03	13	
	½ c.	115	172	2.0	3.3	35	0.63	2.51	2.07	0.20	Trace	.....	.....
Blanc mange: dairy milk.....	½ c.	122	135	4.2	4.7	19	2.68	1.79	1.39	0.17	.....	0.04	17
	½ c.	122	120	3.5	3.2	19	0.40	2.64	0.85	1.61	0.18	.....	.....

¶ Fatty acid values computed from manufacturers' information.

Fatty acid values computed from ingredients.

TABLE 41—Continued

Food†	PORTION		CALO- RIES	PRO- TEIN (Gm.)	FAT (Gm.)	CARBO- HY- DRATE (Gm.)	TOTAL FATTY ACIDS		UNSATURATED FATTY ACIDS				CHOLES- TEROL (Mg.)
	Amount	Weight (Gm.)					Satu- rated (Gm.)	Unsatu- rated (Gm.)	Oleic (Gm.)	Lino- leic (Gm.)	Lino- lenic (Gm.)	Arachi- donic (Gm.)	

Desserts and Sweets—Continued													
Cake:													
applesauce (MF)	1 pc.	65	200	2.0	7.6	32	3.61	3.61	3.03	0.51	Trace	Trace	33
applesauce (VF)	1 pc.	65	200	2.0	7.6	32	1.80	5.42	4.55	0.65	Trace	Trace	28
fruit (MF)	1 pc.	30	106	1.6	4.1	17	1.33	2.57	1.83	0.70	Trace	Trace	22
fruit (VF)	1 pc.	30	106	1.6	4.1	17	0.70	3.20	2.34	0.70	Trace	Trace	19
plain (MF)	1 pc.	55	180	3.5	4.5	31	2.13	2.13	1.75	0.34	0.02	0.01	29
plain (VF)	1 pc.	55	180	3.5	4.5	31	1.15	3.12	2.57	0.38	0.02	0.01	25
Cookies:													
sugar (L)	3-in. diam.	20	64	1.0	2.6	9	1.01	1.46	1.11	0.25	0.01	Trace	12
sugar (VF)	3-in. diam.	20	64	1.0	2.6	9	0.62	1.85	1.53	0.25	0.01	Trace	10
oatmeal (L)	3½-in. diam.	25	114	1.6	4.4	17	1.67	2.51	1.88	0.50	0.01	11
oatmeal (VF)	3½-in. diam.	25	114	1.6	4.4	17	1.00	3.18	2.59	0.50	0.01	8
Custard:													
dairy milk	½ c.	124	140	6.0	6.0	16	2.79	2.91	2.00	0.57	0.01	0.10	107
soybean milk	½ c.	124	140	6.0	6.0	16	1.20	4.50	2.05	2.17	0.26	0.06	94
Ice cream, vanilla	½ c.	70	147	2.8	8.9	15	5.07	3.39	2.62	0.31	0.09	30
Imitation ice cream (MF)	½ c.	70	135	2.8	7.0	15	2.99	3.66	3.13	0.19
(Mellorine) (VF)	½ c.	70	135	2.8	7.0	15	1.26	5.39	4.99	0.11
Pie:													
cream, filling (B)	½ med.	160	338	5.7	13.0	48	5.80	6.50	4.94	1.05	0.05	0.10	103
crust (L)	½ med.	160	338	5.7	13.0	48	3.83	8.52	6.67	1.11	0.05	0.06	89
cream, filling (M)	½ med.	160	328	7.4	13.5	44	5.77	7.06	5.26	1.15	0.06	0.09	115
crust (VF)	½ med.	160	328	7.4	13.5	44	4.49	8.34	6.54	1.15	0.06	0.09	107
custard, crust (L)	½ med.	160	300	3.6	11.2	46	4.47	6.17	4.58	1.06	0.05	0.06	84
custard, crust (VF)	½ med.	160	300	3.6	11.2	46	2.55	8.09	6.60	1.06	0.06	0.04	78
lemon, filling (B)	½ med.	160	325	6.5	12.1	49	5.06	6.44	4.95	1.03	0.05	0.07	115
lemon, filling (M)	½ med.	160	325	6.5	12.1	49	3.68	7.82	6.33	1.03	0.05	0.07	107
crust (VF)	½ med.	160	395	3.1	11.4	70	4.55	6.28	4.77	1.08	0.05	0.06	19
pumpkin, crust (L)	½ med.	160	395	3.1	11.4	70	2.60	8.23	7.04	1.08	0.05	0.04	0
pumpkin, crust (VF)	½ med.	160	395	3.1	11.4	70
raisin, filling (B)	½ med.	160	395	3.1	11.4	70
crust (L)	½ med.	160	395	3.1	11.4	70
raisin, filling (M)	½ med.	160	395	3.1	11.4	70
crust (VF)	½ med.	160	395	3.1	11.4	70

TABLE 41—Continued

Food†	PORTION		CALO- RIES	PRO- TEIN (Gm.)	FAT (Gm.)	CARBO- HY- DRATE (Gm.)	TOTAL FATTY ACIDS		UNSATURATED FATTY ACIDS				CHOLE- TEROL (Mg.)	
	Amount	Weight (Gm.)					Satur- ated (Gm.)	Unsat- rated (Gm.)	Oleic (Gm.)	Lino- leic (Gm.)	Lino- lenic (Gm.)	Arachi- donic (Gm.)		
Desserts and Sweets—Continued														
Pie crust: double 8" diam. (L)..... double 8" diam. (VF)..... bottom 8" diam. (L)..... bottom 8" diam. (VF).....	‡ med.	35	170	2.6	9.4	19	3.75	5.18	4.11	0.71	.....	.....	.....	15
	‡ med.	35	170	2.6	9.4	19	2.14	6.79	5.80	0.71	.....	.....	.....	.....
	‡ med.	20	94	1.5	5.4	11	2.15	2.98	2.36	0.41	.....	.....	.....	8
	‡ med.	20	94	1.5	5.4	11	1.23	3.90	3.33	0.41	.....	.....	.....	.....
Candy: chocolate creams (35 pc/lb).... chocolate fudge (15 pc/lb).... peanut brittle.....	2 pc.	28	110	1.1	4.0	20	2.28	1.52	1.37	0.11	.....	0.01	.....	2
	1 pc.	28	116	0.5	3.2	23	1.82	1.22	1.06	0.09	.....	0.01	.....	2
	1 oz.	28	133	3.4	5.0	19	0.95	3.80	2.42	1.24	.....	.....	.....	.....
Fats, Oils, and Oily Foods														
Butter, 1 square..... Cacao butter..... Lard..... Margarine.....	‡ Tbsp.	7	50	.....	5.7	.....	3.25	2.17	1.68	0.20	.....	0.06	.....	20
	‡ oz.	14	124	.....	14.0	.....	7.98	5.32	5.05	0.27	.....	.....	.....	.....
	1 Tbsp.	14	126	.....	14.0	.....	5.59	7.71	6.12	1.06	.....	.....	.....	15
	1 Tbsp.	14	100	.....	11.3	.....	2.15	8.59	7.20	0.75	.....	.....	.....	.....
Tallow: beef..... mutton.....	1 Tbsp.	14	126	.....	14.0	.....	7.05	6.25	5.59	0.27	0.07	.....	.....	15
	1 Tbsp.	14	126	.....	14.0	.....	7.58	5.72	5.19	0.53	.....	.....	.....	17
Vegetable oils: corn..... cottonseed..... olive..... peanut..... poppyseed..... rapeseed..... safflower..... sesame..... soybean..... sunflower..... teaseed.....	1 Tbsp.	14	124	.....	14.0	.....	1.50	12.08	4.20	7.88	.....	.....	.....	.....
	1 Tbsp.	14	124	.....	14.0	.....	3.33	10.00	3.33	6.65	.....	.....	.....	.....
	1 Tbsp.	14	124	.....	14.0	.....	1.60	11.70	10.77	0.93	.....	.....	.....	.....
	1 Tbsp.	14	124	.....	14.0	.....	2.66	10.64	7.18	3.46	.....	.....	.....	.....
	1 Tbsp.	14	124	.....	14.0	.....	1.46	11.84	2.79	9.04	.....	.....	.....	.....
	1 Tbsp.	14	124	.....	14.0	.....	0.80	12.50	2.39	2.93	0.40	.....	.....	.....
	1 Tbsp.	14	124	.....	14.0	.....	0.93	12.37	2.66	9.31	0.40	.....	.....	.....
	1 Tbsp.	14	124	.....	14.0	.....	1.86	11.44	5.59	5.59	.....	.....	.....	.....
	1 Tbsp.	14	124	.....	14.0	.....	1.73	11.57	3.72	7.05	0.80	.....	.....	.....
	1 Tbsp.	14	124	.....	14.0	.....	1.60	11.70	3.33	8.25	.....	.....	.....	.....
	1 Tbsp.	14	124	.....	14.0	.....	1.33	11.97	10.91	1.06	.....	.....	.....	.....

TABLE 41—Continued

Food†	PORTION		CALO-RIES	PRO-TEIN (Gm.)	FAT (Gm.)	CARBO-HY-DRATE (Gm.)	TOTAL FATTY ACIDS		UNSATURATED FATTY ACIDS				CHOLE-STEROL (Mg.)
	Amount	Weight (Gm.)					Satu-rated (Gm.)	Unsatu-rated (Gm.)	Oleic (Gm.)	Lino-leic (Gm.)	Lino-lenic (Gm.)	Arachi-donic (Gm.)	
Fats, Oils, and Oily Foods—Continued													
<i>Palm oils:</i>													
babassu.....	1 Tbsp.	14	124	.....	14.0	.....	11.30	2.00	1.86	.....	.....	.....	.....
coconut.....	1 Tbsp.	14	124	.....	14.0	.....	12.24	1.10	0.80	0.27	.....	.....	.....
cohuene.....	1 Tbsp.	14	124	.....	14.0	.....	11.84	1.46	1.33	0.13	.....	.....	.....
murumuru.....	1 Tbsp.	14	124	.....	14.0	.....	11.84	1.46	1.33	0.06	.....	.....	.....
palm.....	1 Tbsp.	14	124	.....	14.0	.....	6.38	6.92	5.72	1.20	.....	.....	.....
palm kernel.....	1 Tbsp.	14	124	.....	14.0	.....	11.04	2.26	2.00	0.13	.....	.....	.....
<i>Marine oils:</i>													
herring.....	1 Tbsp.	14	126	.....	14.0	.....	2.93	10.37	2.79	.....	.....	3.72	.....
menhaden.....	1 Tbsp.	14	126	.....	14.0	.....	3.32	10.00	2.00	0.93	0.40	2.26	.....
sardine.....	1 Tbsp.	14	126	.....	14.0	.....	2.39	10.90	3.19	.....	.....	3.46	.....
whale.....	1 Tbsp.	14	126	.....	14.0	.....	3.32	10.00	4.66	.....	.....	2.00	70
<i>Salad dressings:**</i>													
French or mayonnaise-type													
with corn oil.....	1 Tbsp.	15	58	.....	5.4	3	0.62	4.51	2.31	2.15	.....	.....	.....
with cottonseed oil.....	1 Tbsp.	15	58	.....	5.4	3	1.28	3.85	1.28	2.56	.....	.....	.....
Average.....	1 Tbsp.	15	58	.....	5.4	3	0.97	4.16	1.80	2.36	.....	.....	.....
<i>Mayonnaise:</i>													
with corn oil.....	1 Tbsp.	13	92	.....	10.0	.....	1.14	8.36	4.28	3.99	.....	.....	.....
with cottonseed oil.....	1 Tbsp.	13	92	.....	10.0	.....	2.37	7.13	2.38	4.75	.....	.....	.....
Average.....	1 Tbsp.	13	92	.....	10.0	.....	1.80	7.70	3.33	4.37	.....	.....	.....
Legumes													
Soybeans, plain cooked.....	1 c.	32 (dry)	105	11	5.8	11	0.72	4.79	1.54	2.92	0.33	.....	.....
Broad beans, plain cooked.....	1 c.	32 (dry)	108	8	0.54	18	0.04	0.47	0.23	0.19	.....	.....	.....
(Garbanzo (chick peas).....	1 c.	32 (dry)	115	6.7	1.5	19	0.13	1.30	0.73	0.55	.....	.....	.....
Mung beans.....	1 c.	32 (dry)	108	7.8	0.45	19	0.17	0.26	0.08	0.17	0.01	.....	.....

** Warm climates, cottonseed oil throughout year; cold climate, corn oil in winter.

TABLE 41—Continued

Food†	PORTION		CALO-RIES	PRO-TEIN (Gm.)	FAT (Gm.)	CARBO-HY-DRATE (Gm.)	TOTAL FATTY ACIDS		UNSATURATED FATTY ACIDS				CHOL-STEROL (Mg.)	
	Amount	Weight (Gm.)					Satu-rated (Gm.)	Unsatu-rated (Gm.)	Oleic (Gm.)	Lino-leic (Gm.)	Lino-lenic (Gm.)	Arachi-donic (Gm.)		
Meat and Poultry—Raw Edible Portions unless Stated Otherwise														
Bacon.....	2 sl.	16	97	4.0	8.8	.....	3.09	5.27	4.43	0.75	0.04	0.03	16	.....
Beef:														.....
chuck.....	3½ oz.	100	224	18.6	16.0	.....	6.84	8.36	7.90	0.30	0.07	0.05	.....	.....
roast.....	3½ oz.	100	282	17.4	23.0	.....	9.18	12.67	12.02	0.28	0.10	0.04	.....	.....
round.....	3½ oz.	100	182	19.5	11.0	.....	4.70	5.75	5.43	0.21	0.05	0.03	125	.....
Chicken:														.....
fryer.....	3½ oz.	100	150	20.2	7.2	.....	2.33	4.51	2.05	2.26	0.11	0.11	60-90	.....
roasting.....	3½ oz.	100	200	20.0	12.6	.....	3.83	8.14	5.63	2.27	0.13	0.07	60-90	.....
stewing.....	3½ oz.	100	302	18.0	25.0	.....	5.94	17.81	11.16	6.18	0.19	0.14	60-90	.....
Duck, domestic.....	3½ oz.	100	326	16.0	28.6	.....	7.34	19.83	11.41	6.52	0.38	0.05	.....	.....
Goose, domestic.....	3½ oz.	100	354	16.4	31.5	.....	8.98	20.95	17.06	2.39	0.12	.....	.....	.....
Ham:														.....
canned (Prem).....	2 oz.	57	164	8.4	13.8	.....	5.24	7.87	6.55	1.18	0.08	0.05	70-105	.....
pan broiled.....	3½ oz.	100	344	15.2	31.0	.....	10.60	18.85	16.20	2.36	0.15	0.12	70-105	.....
Lamb:														.....
chop.....	3½ oz.	100	356	14.9	32.4	.....	17.85	12.93	12.00	0.40	0.21	0.09	70	.....
leg.....	3½ oz.	100	235	18.0	17.5	.....	9.15	7.48	6.82	0.28	0.15	0.07	70	.....
Pigeon.....	3½ oz.	100	279	18.6	22.1	.....	4.83	16.17	11.76	3.57	0.15	.....	.....	.....
Pork:														.....
loin or chops.....	3½ oz.	100	296	16.4	25.0	.....	9.50	14.25	12.11	1.90	0.17	0.05	70-105	.....
ground.....	3½ oz.	100	416	13.0	40.0	.....	14.44	23.56	19.00	3.04	0.23	0.08	70-105	.....
Rabbit, domestic.....	3½ oz.	100	175	20.8	10.2	.....	3.78	5.91	3.59	1.16	0.19	0.19	.....	.....
Turkey:														.....
dark meat.....	3½ oz.	100	177	23.2	9.6	.....	2.74	6.38	4.29	1.82	0.07	0.13	16-26	.....
light meat.....	3½ oz.	100	139	24.5	4.6	.....	1.31	3.10	1.97	0.96	0.03	0.07	8-15	.....
skin, roasted.....	3½ oz.	100	.....	.....	26.7	.....	7.10	18.27	12.69	5.07	0.23	0.25	.....	.....

TABLE 41—Continued

Food†	PORTION		CALO- RIES	PRO- TEIN (Gm.)	FAT (Gm.)	CARBO- HY- DRATE (Gm.)	TOTAL FATTY ACIDS		UNSATURATED FATTY ACIDS				CHOLE- STEROL (Mg.)		
	Amount	Weight (Gm.)					Satu- rated (Gm.)	Unsatu- rated (Gm.)	Oleic (Gm.)	Lino- leic (Gm.)	Lino- lenic (Gm.)	Arachi- donic (Gm.)			
Nuts, Oily Fruits, and Seeds															
Nuts, raw or roasted:††	almond	12-15	15	2.8	8.1	3.0	0.23	7.46	5.93	1.54					
	Brazil	2 med.	15	2.2	9.9	1.7	1.77	7.43	4.52	2.82					
	cashew	6-8	15	2.8	7.2	4.1	0.96	5.88	4.79	1.03					
	coconut														
	fresh	1 oz.	15	0.5	5.2	2.1	4.54	0.40	0.29	0.10					
	shredded, dried	2 Tbsp.	15	0.5	5.9	8.0	5.16	0.45	0.34	0.11					
	filbert (hazelnut)	10-12	15	1.9	9.1	2.7	0.52	8.13	5.28	1.21					
	peanut	15-17	15	4.0	6.6	3.5	1.25	5.02	3.39	1.63					
	peanut butter														
	non-hydrogenated	1 Tbsp.	16	4.2	7.8	3.0	1.48	5.93	4.00	1.93					
Fruits, oily:	avocado	1 Tbsp.	16	4.1	8.0	3.0	1.70	5.70	3.85	1.85					
	olives	12 halves	15	1.4	11.0	2.0	0.63	9.82	7.42	2.30					
	pignolia (P. pinea)	1 c. (scant)	15	5.1	7.4	1.0	0.56	6.47	3.02	3.44					
	pinones (P. monophylla)	1 c. (scant)	15	1.4	3.4	8.0	0.29	2.94	1.94	1.00					
	pistachio	30 nuts	15	2.9	8.0	2.8	1.14	6.46	4.94	1.52					
	walnuts														
	black	8-10 halves	15	2.7	8.7	2.8	0.50	7.77	2.98	4.14	0.64				
	English	8-15 halves	15	2.3	9.7	2.3	0.65	8.57	2.12	6.18	0.28				
	Macadamia nut	8 halves	15	1.4	11.7	1.2	1.78	9.34	6.67	0.22					
Seeds:	alfalfa, U.S. grown	1 c. (cubed)	75	1.3	20.0	4	3.80	15.20	12.54	2.66					
	flaxseed, U.S. grown	6 "mammoth"	40	0.7	8.4	1	0.96	7.02	6.46	0.56					
	poppyseed														
	sesame														
	sunflower														
	pumpkin														
	squash														
	watermelon														

†† Roasted nuts—fatty acid composition similar to raw nuts. Approximately 1 gm. of roasting oil (peanut, corn, cottonseed, or coconut) retained per 100 gm. of roasted nuts.

TABLE 41—Continued

Food†	PORTION		CALO-RIES	PRO-TEIN (Gm.)	FAT (Gm.)	CARBO- HY- DRATE (Gm.)	TOTAL FATTY ACIDS		UNSATURATED FATTY ACIDS				CHOLES- TEROL (Mg.)	
	Amount	Weight (Gm.)					Satu- rated (Gm.)	Unsatu- rated (Gm.)	Oleic (Gm.)	Lino- leic (Gm.)	Lino- lenic (Gm.)	Arachi- donic (Gm.)		
Prepared Plant Proteins														
Commercially prepared plant proteins:†† a) low-fat "gluten" type entrees Cutletburger and Vegeburger dinner cuts, ground wheat gluten, Veelets, and Vege- cuts (average)..... b) medium-fat entrees..... Linketts..... Numete..... Nuteena..... Proast..... Proteena..... Vegetona..... Vegetlets N' Gravy..... Vegebits..... Weighted average of group b	2 oz.	60	62	10.8	0.55	4	0.08	0.44	0.13	0.26	0.04			
	2 oz.	60	50	9.0	0.30	3	0.05	0.24	0.07	0.14				
	2 oz.	60	115	12.9	6.2	3	1.35-	4.54	3.36	0.88				
	2 oz.	60	150	7.9	10.1	7	2.11	7.48	5.09	2.39				
	2 oz.	60	125	7.2	7.2	8	1.37	5.47	3.49	1.91	0.03			
	2 oz.	60	110	13.9	3.2	8	0.55	2.49	1.55	0.91				
	2 oz.	60	115	11.4	5.1	5.4	0.97	3.88	2.48	1.36	0.03			
	2 oz.	60	85	15.2	3.6	4	0.75	2.67	1.92	0.65				
	2 oz.	60	80	6.5	3.6	5	0.48	2.94	1.50	1.30	0.14			
	2 oz.	60	75	10.2	2.4	5	0.52	1.76	1.28	0.36	0.02			
	2 oz.	60	120	10.8	6.0	9	1.14	4.56	3.08	1.42	0.02			
	2 Tbsp.	32		46	2.5	2.7	3	0.41	2.15	1.49	0.64			
	2 Tbsp.	32		75	4.1	5.3	3	0.60	4.44	2.27	2.17			
	Home-made vegetarian entrees:§§ carrot roast with peanut butter garbanzo loaf..... soybean loaf..... walnut timbale.....	1 c.	140	360	14.0	27.0	19	5.90	19.75	13.59	5.90	0.02	0.02	43
1 c.		140	182	7.0	7.5	22	1.57	5.56	4.35	0.86	0.02	0.02	33	
1 c.		135	176	9.0	7.5	19	1.85	5.28	2.99	2.00	0.21	0.03	50	
1 c.		150	290	9.3	18.0	24	3.76	13.34	5.13	4.96	0.31	0.05	77	
Miscellaneous														
Chocolate, unsweetened..... Cocoa powder.....	1 oz.	28	142	1.6	15.0	8	8.55	5.70	5.42	0.28				
	2 Tbsp.	14	42	1.2	3.4	6.8	1.94	1.29	1.23	0.06				
Rice: bran..... polished..... Wheat germ.....	1 oz.	28	94	3.4	3.6	12	0.62	2.80	1.61	1.16	0.03			
	1 oz.	28	105	3.4	2.9	17	0.50	2.26	1.30	0.95	0.03			
	1 c.	34	123	8.5	3.4	17	0.55	2.68	0.81	1.55	0.26			

†† Fatty acid values computed from manufacturers' information.

§§ Fatty acid values computed from ingredients.

TABLE 42*

SUPPLEMENTARY TABLE ON FOOD COMPOSITION

Food	SERVING		CALO- RIES	PROTEIN		FAT			CAR- BO- HY- DRATE (Gm.)	FATTY ACIDS		UNSATURATED FATTY ACIDS			
	Amount	Weight (Gm.)		Ani- mal (Gm.)	Vege- table (Gm.)	Ani- mal (Gm.)	Vege- table (Gm.)	Choles- terol (Mg.)		Total satu- rated (Gm.)	Total unsatu- rated (Gm.)	Oleic (Gm.)	Lino- leic (Gm.)	Lino- lenic (Gm.)	Ara- chi- donic (Gm.)
Bread Products															
Bread, white.....	1 sl.	23	61	0.2	1.6	0.7	0.2	0.8	11	0.27	0.53	0.37	0.15	0.01	—
Doughnut, plain (made with hy- drogenated vegetable shorten- ing, fried in hydrogenated beef fat).....	1	32	139	0.7	1.7	5.7	1.0	26.6	17	2.59	3.77	3.53	0.21	0.02	0.01
French toast, grilled.....	1 sl.	—	153	3.4	1.6	7.9	0.2	143.7	15	3.87	3.83	2.86	0.70	0.07	0.11
with 1 tsp. butter.....	1 sl.	—	153	3.4	1.6	3.8	4.3	129.5	15	2.25	5.44	4.42	0.90	0.07	0.05
with 1 tsp. margarine.....	2 cakes	75	294	3.5	4.3	3.6	7.2	91.0	41	3.03	7.25	6.22	0.91	0.08	0.04
Griddle cake (made with hydro- genated vegetable shortening)	1 serving	75	246	3.7	2.9	3.7	9.4	128.3	25	3.31	9.05	7.86	1.05	0.09	0.05
Waffle (made with hydrogenated vegetable shortening).....	1	54	186	0.9	3.9	5.4	0.4	37.5	28	2.00	3.47	2.55	0.84	0.05	0.03
Sweet roll (made with lard)....															
Dairy Products															
Cheese															
Cheddar.....	1 cu. in.	28.35	113	7.1	—	9.1	—	31.5	1	5.38	3.27	3.05	0.13	0.07	0.02
cottage, skim.....	1 Tbsp. rounded	28.35	27	5.5	—	0.1	—	0.3	1	—	—	—	—	—	—
cream.....	2 Tbsp.	28.35	106	2.6	—	10.5	—	36.3	1	6.04	3.94	3.42	0.36	0.01	0.15
Cream															
light, 20%.....	2 Tbsp.	30	61	0.9	—	6.0	—	20.8	1	3.45	2.25	1.94	0.21	0.01	0.09
heavy, whipped, and sweetened	1 Tbsp. heap- ing	16	52	0.3	—	5.2	—	18.0	1	2.99	1.95	1.69	0.18	0.01	0.07
Milk															
non-fat (skim).....	1 c.	246	87	8.6	—	0.2	—	0.7	13	0.11	0.08	0.07	0.01	—	—
whole.....	1 c.	244	166	8.5	—	9.5	—	32.9	12	5.24	3.79	3.20	0.55	—	0.04
Yogurt (from whole milk).....	1 Tbsp.	14	13	0.9	—	0.5	—	1.7	1	0.28	0.20	0.17	0.03	—	—

* Fat, fatty acid, and cholesterol content of foods from O. B. Hayes and G. Rose, J. Am. Dietet. A., 33: 27-28, 1957. In all columns, — indicates no value; (—) indicates figure not available for calculating value.

TABLE 42—Continued

FOOD	SERVING		CALO- RIES	PROTEIN		FAT			CAR- BO- HY- DRATE (Gm.)	FATTY ACIDS		UNSATURATED FATTY ACIDS				
	Amount	Weight (Gm.)		Ani- mal (Gm.)	Vege- table (Gm.)	Ani- mal (Gm.)	Vege- table (Gm.)	Choles- terol (Mg.)		Total satu- rated (Gm.)	Total unsatu- rated (Gm.)	Oleic (Gm.)	Lino- leic (Gm.)	Lino- lenic (Gm.)	Ara- chi- donic (Gm.)	
Desserts																
Cake, white plain (made with hydrogenated vegetable shortening)..... if sugar-frosted, add..... Cake, fudge† plain (made with hydrogenated vegetable shortening)..... if fudge-frosted, add..... Cookies, sugar (made with but- ter)..... Custard, baked..... Ice cream, vanilla†..... Pie cream (filling made with but- ter, crust with hydrogenated vegetable shortening)..... fruit (filling made with butter, crust' with hydro- genated vegetable shorten- ing).....	1 pc. — 1 pc. — 1 ½ c. ½ c. ½ of 8-in. pie ½ of 8-in. pie	65 25 75 30 18 126 71 160 160	227 63 281 93 56 141 147 330 402	1.4 — 1.6 0.5 0.3 5.9 2.8 3.8 —	1.3 — 1.9 0.1 0.5 — — 0.7 1.9	1.4 — 1.6 1.9 2.1 6.0 8.9 6.9 3.8	7.1 — 9.9 0.4 0.1 — — 2.5 14.6	44.6 — 56.7 6.6 20.8 151.7 30.8 130.9 13.3	36 17 43 19 8 16 15 47 60	2.02 — 2.40 1.07 1.17 2.76 4.91 3.85 4.95	6.10 — 7.71 0.72 0.90 2.95 3.55 5.01 12.33	5.49 — 6.93 0.62 0.72 2.12 2.99 4.09 11.41	0.56 — 0.70 0.08 0.14 0.70 0.52 0.78 0.84	0.03 — 0.05 — 0.01 0.06 — 0.06 0.03	0.02 — 0.03 0.02 0.03 0.07 0.04 0.08 0.05	
Fats																
Butter..... Bacon, cooked..... Bacon, fat..... Salad dressing, cooked..... Hydrogenated vegetable shorten- ing..... Margarine..... Mayonnaise (made with cotton- seed oil)..... Olives, ripe.....	1 tsp. 2 sl. 1 Tbsp. 1 Tbsp. 1 Tbsp. 1 tsp. 1 Tbsp. 5 large or 10 small	5 16 14 14 12.5 5 14 32.5	36 97 126 22 110 36 91 35	— 4.0 — 0.4 — — 0.1 —	— — — 0.1 — — — 0.5	4.1 8.8 14.0 1.0 — — 0.1 —	— — — — 12.5 4.1 10.1 3.5	14.2 16.0 25.5 24.5 — — 7.8 —	— — — 3 — — — 1.0	2.36 2.93 4.67 0.49 2.40 0.74 2.64 0.52	1.54 5.43 8.63 0.49 9.48 3.15 7.12 2.84	1.34 4.60 7.30 0.35 8.91 2.90 1.84 2.51	0.14 0.76 1.21 0.11 0.56 0.25 5.28 0.33	— 0.04 0.07 0.01 0.01 — — —	0.06 0.03 0.05 0.02 — — — —	

† Fatty acid values for cocoa were not available and therefore are not included in the fatty acid figures given.

‡ Fatty acid values calculated from butter-fat figures.

TABLE 42—Continued

FOOD	SERVING		CALO- RIES	PROTEIN		FAT			CAR- BO- HY- DRATE (Gm.)	FATTY ACIDS		UNSATURATED FATTY ACIDS			
	Amount	Weight (Gm.)		Ani- mal (Gm.)	Vege- table (Gm.)	Ani- mal (Gm.)	Vege- table (Gm.)	Choles- terol (Mg.)		Total satu- rated (Gm.)	Total unsatu- rated (Gm.)	Oleic (Gm.)	Lino- leic (Gm.)	Lino- lenic (Gm.)	Ara- chi- donic (Gm.)
Fats—Continued															
Vegetable oils															
coconut.....	1 Tbsp.	14	124	—	—	—	14.0	—	—	12.17	1.13	0.80	0.33	—	—
corn.....	1 Tbsp.	14	124	—	—	—	14.0	—	—	1.50	12.08	4.20	7.88	—	—
cottonseed.....	1 Tbsp.	14	124	—	—	—	14.0	—	—	3.59	9.71	2.46	7.25	—	—
olive.....	1 Tbsp.	14	124	—	—	—	14.0	—	—	2.06	11.37	10.04	1.33	—	—
peanut.....	1 Tbsp.	14	124	—	—	—	14.0	—	—	2.66	10.64	7.00	3.64	—	—
soybean.....	1 Tbsp.	14	124	—	—	—	14.0	—	—	1.67	11.63	4.53	7.10	0.61	—
safflower.....	1 Tbsp.	14	124	—	—	—	14.0	—	—	0.84	13.16	3.70	9.42	0.03	—
vegetable oils															
(av. corn, cottonseed, olive	1 Tbsp.	14	124	—	—	—	14.0	—	—	2.38	11.05	5.57	5.49	—	—
oils).....															
White sauce, medium															
made with butter.....	1 c.	66	112	2.2	0.6	8.1	0.1	28.1	7	4.62	3.15	2.69	0.36	0.01	0.09
made with margarine.....	1 c.	66	112	2.2	0.6	2.4	5.8	8.2	7	2.37	5.40	4.86	0.52	0.01	0.01
Fish															
Cod.....	1 serving	120	89	19.8	—	0.5	—	60.0	—	0.14	0.34	(—)	(—)	(—)	(—)
Flounder.....	1 serving	120	82	17.9	—	0.6	—	72.0	—	(—)	—	(—)	(—)	(—)	(—)
Frog.....	2-3 large legs	100	73	16.4	—	0.3	—	40.0	—	0.05	0.23	(—)	(—)	(—)	(—)
Haddock.....	1 serving	120	95	21.8	—	0.1	—	76.8	—	(—)	—	(—)	(—)	(—)	(—)
Halibut.....	1 serving	120	151	22.3	—	6.2	—	72.0	—	1.15	4.74	(—)	(—)	(—)	(—)
Lobster, canned.....	1 c.	50	46	9.2	—	0.7	—	104.0	—	(—)	(—)	(—)	(—)	(—)	(—)
Mackerel, Atlantic.....	1 serving	120	226	22.4	—	14.4	—	96.0	—	3.60	10.08	(—)	(—)	(—)	(—)
Oysters.....	1 c. (13-19 medium oysters)	240	200	23.5	—	5.0	—	784.0	13	(—)	(—)	(—)	(—)	(—)	(—)
Salmon, Pacific.....	1 serving	120	268	20.9	—	19.8	—	72.0	—	5.96	12.85	6.27	2.16	—	4.42
Sardines, Atlantic															
(drained solids).....	1 piece 3 X 1 1/2 in.	50	107	12.9	—	5.5	—	35.0	1	1.78	3.45	1.52	0.78	—	1.15
Shrimp, canned, dry pack.....	4-6 shrimp	50	64	13.4	—	0.7	—	75.0	—	(—)	(—)	(—)	(—)	(—)	(—)
Tuna, canned, drained solids.....	1 c.	50	99	14.5	—	4.1	—	30.0	—	(—)	(—)	(—)	(—)	(—)	(—)

‡ Cholesterol value includes total digitonin-precipitable sterols.

FOOD	SERVING		CALO- RIES	PROTEIN		FAT			CAR- BO- HY- DRATE (Gm.)	FATTY ACIDS		UNSATURATED FATTY ACIDS			
	Amount	Weight (Gm.)		Ani- mal (Gm.)	Vege- table (Gm.)	Ani- mal (Gm.)	Vege- table (Gm.)	Choles- terol (Mg.)		Total satu- rated (Gm.)	Total unsatu- rated (Gm.)	Oleic (Gm.)	Lino- leic (Gm.)	Lino- lenic (Gm.)	Ara- chi- donic (Gm.)
Italian Dishes															
Lasagne imbottite (made with olive oil)	1 c. .	240	378	10.4	4.0	21.5	3.4	87.4	24	11.86	11.69	10.18	1.22	0.10	0.19
Meatballs, including olive oil for frying.....	1 meatball 1½ in. diam.	25	94	5.2	0.2	3.4	3.8	68.9	2	1.87	5.01	4.37	0.58	0.04	0.02
Meat sauce (made with olive oil) for grated cheese topping, add	¾ c.	105	140	5.5	1.2	3.1	7.2	28.5	5	2.27	7.42	6.68	0.71	0.02	0.01
Pizza, cheese, and tomato (made with olive oil)	1 Tbsp.	7	28	2.6	—	1.9	—	6.6	—	1.12	0.68	0.64	0.03	0.01	—
Ravioli (not including sauce) ...	1 piece, 5×6 in.	227	695	5.1	16.4	3.7	19.4	12.8	99	4.99	16.52	14.09	2.29	0.13	0.01
	1 c.	202	276	9.1	5.2	8.3	0.6	177.5	34	2.27	7.42	6.68	0.71	0.02	0.01
Meat and Poultry															
Beef round medium fat.....	1 serving	120	218	23.4	—	13.2	—	150.0	—	5.22	7.32	7.03	0.20	0.06	0.03
porterhouse, medium fat.....	1 serving	120	355	19.7	—	30.0	—	150.0	—	11.87	16.63	15.97	0.45	0.14	0.07
sirloin, medium fat.....	1 serving	120	305	20.8	—	24.0	—	150.0	—	9.50	13.30	12.77	0.36	0.11	0.06
Brains, all kinds#.....	1 serving	90	106	8.8	—	7.3	—	2011.5	1	(—)	(—)	—	(—)	(—)	(—)
Chicken fryer breast (without bone).....	1 serving	120	125	28.0	—	0.6	—	108.0	—	0.18	0.39	0.19	0.18	0.01	0.01
leg (without bone).....	1 serving	120	134	24.6	—	3.2	—	72.0	—	0.98	2.06	1.01	0.95	0.05	0.05
Duck, domestic.....	1 serving	120	391	19.2	—	34.3	—	84.0	—	(—)	(—)	(—)	(—)	(—)	(—)
Frankfurter.....	1 serving	51	124	7.0	—	10.0	—	(—)	1	3.62	5.94	5.14	0.73	0.04	0.03
Ham.....	1 serving	120	413	18.2	—	37.2	—	(—)	—	11.94	23.40	9.08	2.56	0.17	0.13
Lamb leg.....	1 serving	120	282	21.6	—	21.0	—	84.0	—	10.55	9.40	8.84	0.32	0.17	0.07
rib chop.....	1 serving	120	427	17.9	—	38.9	—	84.0	—	19.55	17.41	16.36	0.60	0.31	0.14
Liver beef.....	1 serving	120	163	23.6	—	3.8	—	384.0	7	1.04	2.57	1.64	0.45	—	0.48
calf.....	1 serving	120	169	22.8	—	5.9	—	432.0	5	(—)	(—)	(—)	(—)	(—)	(—)
Luncheon meat.....	1 sl.	30	81	4.6	—	6.8	—	(—)	1	2.40	4.10	3.59	0.47	0.01	0.03
Pork, loin or chops (without bone).....	1 serving	120	355	19.7	—	30.0	—	72.0	—	11.00	17.50	15.10	2.14	0.19	0.07
Rabbit, wild.....	1 serving	120	149	25.7	—	4.3	—	96.0	—	1.94	2.14	(—)	(—)	(—)	(—)
Sweetbreads.....	½ pair	120	221	18.2	—	15.8	—	336.0	—	(—)	(—)	(—)	(—)	(—)	(—)
Tripe, beef.....	1 piece, 5×2½ in.	85	84	16.2	—	1.7	—	128.0	—	(—)	(—)	(—)	(—)	(—)	(—)
Veal, leg.....	1 serving	120	228	22.9	—	14.4	—	168.0	—	(—)	(—)	(—)	(—)	(—)	(—)

|| All portions refer to raw, edible portions unless otherwise stated.

Cholesterol value is for beef brain only.

TABLE 42—Continued

Food	SERVING		CALO- RIES	PROTEIN		FAT			CAR- BO- HY- DRATE (Gm.)	FATTY ACIDS		UNSATURATED FATTY ACIDS				
	Amount	Weight (Gm.)		Ani- mal (Gm.)	Vege- table (Gm.)	Ani- mal (Gm.)	Vege- table (Gm.)	Choles- terol (Mg.)		Total satu- rated (Gm.)	Total unsatu- rated (Gm.)	Oleic (Gm.)	Lino- leic (Gm.)	Lino- lenic (Gm.)	Ara- chi- donic (Gm.)	
Nuts																
Almonds.....	12-15 nuts	15	90	—	2.8	—	8.1	—	3	0.23	7.46	5.92	1.54	—	—	—
Peanuts, roasted.....	15-17 nuts	15	84	—	4.0	—	6.6	—	4	1.25	5.02	3.30	1.72	—	—	—
Pistachio nuts.....	30 nuts	15	88	—	2.9	—	8.0	—	3	1.09	6.51	4.95	1.56	—	—	—
Walnuts, English.....	8-15 halves	15	98	—	2.3	—	9.7	—	2	0.60	8.63	2.43	6.20	—	—	—
Miscellaneous Foods																
Avocado.....	½ small pair	100	245	—	1.7	—	26.4	—	5	5.11	19.98	16.69	3.29	—	—	—
Egg.....	1 medium	54	77	6.1	—	5.5	—	340.0	—	1.64	3.58	2.10	1.19	0.16	0.13	—
Wheat germ.....	1 Tbsp., rounded	10	36	—	2.5	—	1.0	—	5	0.10	0.86	0.57	0.29	—	—	—

APPENDIX 6

AMINO ACID CONTENT OF FOODS

The following table is taken from a compilation prepared by M. L. Orr and B. K. Watt, as Home Economics Research Report No. 4 (1957), Household Economics Research Division, Institute of Home Economics, Agricultural Research Service, U.S. Department of Agriculture. The original report contains data on 18 amino acids in 202 food items. Only the average amounts of 8 "essential" amino acids, plus arginine and histidine, have been included in the following table. This table is useful when an average protein content may be assumed. When specific nitrogen or protein content of a food is known, reference may be made to the original publication.

TABLE 43

AMINO ACID CONTENT OF FOODS, 100 GM., EDIBLE PORTION

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
MILK; MILK PRODUCTS												
<i>Milk (Protein, N×6.38):</i>												
cow:												
fluid, whole and non-fat (3.5% protein).....	0.049	0.161	0.223	0.344	0.272	0.086	0.031	0.170	0.178	0.240	0.128	0.092
canned:												
evaporated, unsweetened (7.0% protein).....	0.099	0.323	0.447	0.688	0.545	0.171	0.063	0.340	0.357	0.481	0.256	0.185
condensed, sweetened (8.1% protein).....	0.114	0.374	0.518	0.796	0.631	0.198	0.072	0.393	0.413	0.557	0.296	0.214
dried:												
whole (25.8% protein).....	0.364	1.191	1.648	2.535	2.009	0.632	0.231	1.251	1.316	1.774	0.944	0.680
non-fat (35.6% protein).....	0.502	1.641	2.271	3.493	2.768	0.870	0.318	1.724	1.814	2.444	1.300	0.937
goat (3.3% protein).....	0.039	0.217	0.087	0.278	0.312	0.065	.....	0.121	.....	0.139	0.174	0.068
human (1.4% protein).....	0.023	0.062	0.075	0.124	0.090	0.028	0.027	0.060	0.071	0.086	0.055	0.030
Indian buffalo (4.2% protein).....	0.059	0.212	0.204	0.420	0.331	0.112	0.058	0.177	.....	0.255	0.136	0.086
Milk products:												
buttermilk (3.5% protein, N×6.38)	0.038	0.165	0.219	0.348	0.291	0.082	0.032	0.186	0.137	0.262	0.168	0.099
casein (100.0% protein, N×6.29).. cheese (protein, N×6.38):	1.335	4.277	6.550	10.048	8.013	3.084	0.382	5.389	5.819	7.393	4.070	3.021
blue mold (21.5% protein).....	0.293	0.799	1.449	2.096	1.577	0.559	0.121	1.153	1.028	1.543	0.785	0.701
Camembert (17.5% protein).....	0.239	0.650	1.179	1.706	1.284	0.455	0.099	0.938	0.837	1.256	0.639	0.571
Cheddar (25.0% protein).....	0.341	0.929	1.685	2.437	1.834	0.650	0.141	1.340	1.195	1.794	0.913	0.815
Cheddar processed (23.2% pro- tein).....	0.316	0.862	1.563	2.262	1.702	0.604	0.131	1.244	1.109	1.665	0.847	0.756
cheese foods, Cheddar (20.5% pro- tein).....	0.280	0.761	1.382	1.998	1.504	0.533	0.116	1.099	0.980	1.472	0.749	0.668
cottage (17.0% protein).....	0.179	0.794	0.989	1.826	1.428	0.469	0.147	0.917	0.917	0.978	0.802	0.549

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
<i>MILK PRODUCTS—Continued</i>												
cream cheese (9.0% protein)	0.080	0.408	0.519	0.923	0.721	0.229	0.085	0.547	0.408	0.538	0.313	0.278
Limburger (21.2% protein)	0.289	0.788	1.429	2.067	1.555	0.552	0.120	1.136	1.014	1.522	0.774	0.691
Parmesan (36.0% protein)	0.491	1.337	2.426	3.510	2.641	0.937	0.203	1.930	1.721	2.584	1.315	1.174
Swiss (27.5% protein)	0.375	1.021	1.853	2.681	2.017	0.715	0.155	1.474	1.315	1.974	1.004	0.896
Swiss processed (26.4% protein) . .	0.360	0.981	1.779	2.574	1.937	0.687	0.149	1.415	1.262	1.895	0.964	0.861
lactalbumin (100.0% protein, N× 6.49)	2.203	5.239	6.209	12.342	9.060	2.250	3.405	4.360	3.806	5.686	3.498	1.911
whey (Protein, N×6.49)												
fluid (0.9% protein)	0.010	0.048	0.052	0.074	0.055	0.013	0.018	0.023	0.009	0.045	0.017	0.011
dried (12.7% protein)	0.147	0.677	0.734	1.043	0.769	0.188	0.250	0.323	0.131	0.640	0.235	0.159
<i>EGGS, CHICKEN (Protein, N×6.25)</i>												
Fresh or stored:												
whole (12.8% protein)	0.211	0.637	0.850	1.126	0.819	0.401	0.299	0.739	0.551	0.950	0.840	0.307
whites (10.8% protein)	0.164	0.477	0.698	0.950	0.648	0.420	0.263	0.689	0.449	0.842	0.634	0.233
yolks (16.3% protein)	0.235	0.827	0.996	1.372	1.074	0.417	0.274	0.717	0.756	1.121	1.132	0.368
Dried:												
whole (46.8% protein)	0.771	2.329	3.108	4.118	2.995	1.468	1.093	2.703	2.014	3.474	3.070	1.123
whites (85.9% protein)	1.306	3.793	5.553	7.559	5.154	3.340	2.089	5.484	3.573	6.693	5.044	1.855
yolks (31.2% protein)	0.449	1.582	1.907	2.626	2.057	0.799	0.524	1.373	1.448	2.147	2.167	0.704
<i>MEAT; POULTRY; FISH AND SHELL- FISH; THEIR PRODUCTS</i>												
<i>Meat (Protein, N×6.25):</i>												
beef carcass or side:												
thin (18.8% protein)	0.220	0.830	0.984	1.540	1.642	0.466	0.238	0.773	0.638	1.044	1.212	0.653
medium fat (17.5% protein)	0.204	0.773	0.916	1.434	1.529	0.434	0.221	0.720	0.594	0.972	1.128	0.608
fat (16.3% protein)	0.190	0.720	0.853	1.335	1.424	0.404	0.206	0.670	0.553	0.905	1.051	0.566
very fat (13.7% protein)	0.160	0.605	0.717	1.122	1.197	0.340	0.173	0.563	0.465	0.761	0.883	0.476
medium fat, trimmed to retail basis (18.2% protein)	0.213	0.804	0.952	1.491	1.590	0.451	0.230	0.748	0.617	1.010	1.174	0.632

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
MEAT; POULTRY; FISH—Continued												
beef cuts, medium fat:												
chuck (18.6% protein).....	0.217	0.821	0.973	1.524	1.625	0.461	0.235	0.765	0.631	1.033	1.199	0.646
flank (19.9% protein).....	0.232	0.879	1.041	1.630	1.738	0.494	0.252	0.818	0.675	1.105	1.283	0.691
hamburger (16.0% protein)....	0.187	0.707	0.837	1.311	1.398	0.397	0.202	0.658	0.543	0.888	1.032	0.556
porterhouse (16.4% protein)....	0.192	0.724	0.858	1.343	1.433	0.407	0.207	0.674	0.556	0.911	1.057	0.569
rib roast (17.4% protein).....	0.203	0.768	0.910	1.425	1.520	0.432	0.220	0.715	0.590	0.966	1.122	0.604
round (19.5% protein).....	0.228	0.861	1.020	1.597	1.704	0.484	0.246	0.802	0.661	1.083	1.257	0.677
rump (16.2% protein).....	0.189	0.715	0.848	1.327	1.415	0.402	0.205	0.666	0.550	0.899	1.045	0.562
sirloin (17.3% protein).....	0.202	0.764	0.905	1.417	1.511	0.429	0.219	0.711	0.587	0.960	1.116	0.601
beef, canned (25.0% protein).....	0.292	1.104	1.308	2.048	2.184	0.620	0.316	1.028	0.848	1.388	1.612	0.868
beef, dried or chipped (34.3% pro- tein).....	0.401	1.515	1.795	2.810	2.996	0.851	0.434	1.410	1.163	1.904	2.212	1.191
lamb carcass or side:												
thin (17.1% protein).....	0.222	0.782	0.886	1.324	1.384	0.410	0.224	0.695	0.594	0.843	1.114	0.476
medium fat (15.7% protein)....	0.203	0.718	0.814	1.216	1.271	0.377	0.206	0.638	0.545	0.774	1.022	0.437
fat (13.0% protein).....	0.168	0.595	0.674	1.007	1.052	0.312	0.171	0.528	0.451	0.641	0.847	0.362
lamb cuts, medium fat:												
leg (18.0% protein).....	0.233	0.824	0.933	1.394	1.457	0.432	0.236	0.732	0.625	0.887	1.172	0.501
rib (14.9% protein).....	0.193	0.682	0.772	1.154	1.206	0.358	0.195	0.606	0.517	0.734	0.970	0.415
shoulder (15.6% protein).....	0.202	0.714	0.809	1.208	1.263	0.374	0.205	0.634	0.542	0.769	1.016	0.434
pork, packer's carcass or side:												
thin (14.1% protein).....	0.183	0.654	0.724	1.038	1.157	0.352	0.165	0.555	0.503	0.733	0.864	0.487
medium fat (11.9% protein)....	0.154	0.552	0.611	0.876	0.977	0.297	0.139	0.468	0.425	0.619	0.729	0.411
fat (9.8% protein).....	0.127	0.455	0.503	0.721	0.804	0.245	0.114	0.386	0.350	0.510	0.601	0.339
pork cuts, medium fat, fresh:												
ham (15.2% protein).....	0.197	0.705	0.781	1.119	1.248	0.379	0.178	0.598	0.542	0.790	0.931	0.525
loin (16.4% protein).....	0.213	0.761	0.842	1.207	1.346	0.409	0.192	0.646	0.585	0.853	1.005	0.567
miscellaneous lean cuts (14.5% protein).....	0.188	0.673	0.745	1.067	1.190	0.362	0.169	0.571	0.517	0.754	0.889	0.501

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
MEAT; POULTRY; FISH—Continued												
pork, cured:												
bacon, medium fat (9.1% protein)	0.095	0.306	0.399	0.728	0.587	0.141	0.106	0.434	0.234	0.434	0.622	0.246
fat back or salt pork (3.9% pro- tein).....	0.006	0.141	0.110	0.367	0.317	0.055	0.043	0.157	0.052	0.168	0.379	0.035
ham (16.9% protein).....	0.162	0.692	0.841	1.306	1.420	0.411	0.273	0.646	0.652	0.879	1.068	0.544
luncheon meat:												
boiled ham (22.8% protein)...	0.219	0.934	1.135	1.762	1.915	0.554	0.368	0.872	0.879	1.186	1.441	0.733
canned, spiced (14.9% protein)	0.143	0.610	0.741	1.151	1.252	0.362	0.241	0.570	0.575	0.775	0.942	0.479
rabbit, domesticated, flesh only (21.0% protein).....	.....	1.021	1.082	1.636	1.818	0.541	.....	0.793	.....	1.021	1.176	0.474
veal, carcass or side:												
thin (19.7% protein).....	0.258	0.854	1.040	1.444	1.645	0.451	0.233	0.801	0.709	1.018	1.283	0.634
medium fat (19.1% protein).....	0.251	0.828	1.008	1.400	1.595	0.437	0.226	0.776	0.688	0.987	1.244	0.614
fat (18.5% protein).....	0.243	0.802	0.977	1.356	1.545	0.423	0.219	0.752	0.666	0.956	1.205	0.595
veal cuts, medium fat:												
round (19.5% protein).....	0.256	0.846	1.030	1.429	1.629	0.446	0.231	0.792	0.702	1.008	1.270	0.627
shoulder (19.4% protein).....	0.255	0.841	1.024	1.422	1.620	0.444	0.230	0.788	0.698	1.003	1.263	0.624
stew meat (18.3% protein).....	0.240	0.793	0.966	1.341	1.528	0.419	0.217	0.744	0.659	0.946	1.192	0.589
Poultry (Protein, N×6.25):												
chicken, flesh only:												
broilers or fryers (20.6% protein).	0.250	0.877	1.088	1.490	1.810	0.537	0.277	0.811	0.725	1.012	1.302	0.593
hens (21.3% protein).....	0.259	0.907	1.125	1.540	1.871	0.556	0.286	0.838	0.750	1.046	1.346	0.613
ducks, domesticated, flesh only (21.4% protein).....	.....	0.935	1.109	1.657	1.842	0.531	.....	0.842	.....	1.027	1.301	0.486
turkey, flesh only (24.0% protein)...	.....	1.014	1.260	1.836	2.173	0.664	0.330	0.960	.....	1.187	1.513	0.649

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cytaine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
MEAT; POULTRY; FISH—Continued												
<i>Fish and shellfish (Protein, N×6.25):</i>												
bluefish (20.5% protein).....	0.203	0.889	1.040	1.548	1.797	0.597	0.276	0.761	0.554	1.092	1.155	.....
cod:												
fresh (16.5% protein).....	0.164	0.715	0.837	1.246	1.447	0.480	0.222	0.612	0.446	0.879	0.929	.....
dried (81.8% protein).....	0.811	3.547	4.149	6.178	7.172	2.382	1.099	3.036	2.212	4.358	4.607	.....
croaker (17.8% protein).....	0.177	0.772	0.903	1.344	1.561	0.518	0.239	0.661	0.481	0.948	1.002	.....
eel (18.6% protein).....	0.185	0.806	0.943	1.405	1.631	0.542	0.250	0.690	0.503	0.991	1.048	.....
flounder (14.9% protein).....	0.148	0.646	0.756	1.125	1.306	0.434	0.200	0.553	0.403	0.794	0.839	.....
haddock (18.2% protein).....	0.181	0.789	0.923	1.374	1.596	0.530	0.245	0.676	0.492	0.970	1.025	.....
halibut (18.6% protein).....	0.185	0.806	0.943	1.405	1.631	0.542	0.250	0.690	0.503	0.991	1.048	.....
herring:												
Atlantic (18.3% protein).....	0.182	0.793	0.928	1.382	1.605	0.533	0.246	0.679	0.495	0.975	1.031	.....
lake (18.5% protein).....	0.184	0.802	0.938	1.397	1.622	0.539	0.249	0.687	0.500	0.986	1.042	.....
Pacific (16.6% protein).....	0.165	0.720	0.842	1.254	1.455	0.483	0.223	0.616	0.449	0.884	0.935	.....
mackerel:												
raw, common Atlantic (18.7% protein).....	0.186	0.811	0.948	1.412	1.640	0.545	0.251	0.694	0.506	0.996	1.053	.....
canned, solids and liquid:												
Atlantic (19.3% protein).....	0.191	0.837	0.979	1.458	1.692	0.562	0.259	0.716	0.522	1.028	1.087	.....
Pacific (21.1% protein).....	0.209	0.915	1.070	1.593	1.850	0.614	0.284	0.783	0.571	1.124	1.188	.....
salmon:												
raw, Pacific (Chinook or King) (17.4% protein).....	0.173	0.754	0.883	1.314	1.526	0.507	0.234	0.646	0.470	0.927	0.980	.....
canned, solids and liquid (sockeye or red) (20.2% protein).....	0.200	0.876	1.025	1.526	1.771	0.588	0.271	0.750	0.546	1.076	1.138	.....
sardines, canned, solids and liquid:												
Atlantic type (21.1% protein)...	0.209	0.915	1.070	1.593	1.850	0.614	0.284	0.783	0.571	1.124	1.188	.....
Pacific type (17.7% protein)...	0.176	0.767	0.898	1.337	1.552	0.515	0.238	0.657	0.479	0.943	0.997	.....
shrimp, canned, solids and liquid (18.7% protein).....	0.186	0.811	0.948	1.412	1.640	0.545	0.251	0.694	0.506	0.996	1.053	.....

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
MEAT; POULTRY; FISH—Continued												
<i>Products from meat, poultry, and fish</i>												
<i>(Protein, N×6.25):</i>												
brains (10.4% protein).....	0.138	0.404	0.504	0.845	0.760	0.220	0.145	0.506	0.433	0.536	0.614	0.278
chitterlings (8.6% protein).....	0.004	0.308	0.308	0.457	0.670	0.193	0.109	0.359	0.228	0.402	1.406	0.169
fish flour (76.0% protein).....	0.754	4.378	4.232	6.189	7.381	2.019	.....	2.845	.....	3.016	5.204	1.289
gelatin (85.6% protein, N×5.55)...	0.006	1.012	1.357	2.030	4.226	0.787	0.077	2.036	0.401	2.421	7.866	0.771
gizzard, chicken (23.1% protein)...	0.207	1.072	1.094	1.689	1.567	0.554	0.218	0.968	0.680	1.116	1.741	0.480
heart:												
beef or pork (16.0% protein).....	0.219	0.776	0.857	1.509	1.387	0.403	0.168	0.765	0.627	0.973	1.068	0.433
chicken (20.5% protein).....	0.266	0.941	1.040	1.830	1.683	0.489	0.203	0.928	0.761	1.181	1.206	0.525
kidney:												
beef (15.0% protein).....	0.221	0.665	0.730	1.301	1.087	0.307	0.182	0.706	0.557	0.876	0.934	0.377
pork (16.3% protein).....	0.240	0.722	0.793	1.414	1.181	0.334	0.108	0.707	0.605	0.952	1.015	0.409
sheep (16.6% protein).....	0.244	0.736	0.807	1.440	1.203	0.340	0.202	0.781	0.610	0.909	1.033	0.417
liver:												
beef or pork (19.7% protein)....	0.206	0.936	1.031	1.819	1.475	0.463	0.243	0.903	0.738	1.239	1.201	0.523
calf (19.0% protein).....	0.286	0.903	0.994	1.754	1.423	0.447	0.234	0.958	0.711	1.195	1.158	0.505
chicken (22.1% protein).....	0.332	1.050	1.150	2.040	1.655	0.520	0.272	1.114	0.827	1.390	1.347	0.587
sheep or lamb (21.0% protein)....	0.316	0.998	1.099	1.939	1.572	0.494	0.259	1.058	0.786	1.320	1.280	0.558
pancreas:												
beef (13.5% protein).....	0.175	0.626	0.683	1.054	0.906	0.244	.....	0.502	0.590	0.724	0.771	0.266
pork (14.5% protein).....	0.188	0.673	0.733	1.132	1.070	0.262	.....	0.603	0.633	0.777	0.828	0.285
pork or beef, canned (14.3% pro- tein).....	0.151	0.618	0.730	1.190	1.345	0.327	0.261	0.570	0.579	0.810	1.050	0.460
potted meat (16.1% protein).....	0.149	0.602	0.641	1.203	1.061	0.361	.....	0.641	.....	0.943	1.002	0.522

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
MEAT; POULTRY; FISH—Continued												
sausage:												
Bologna (14.8% protein).....	0.126	0.606	0.718	1.061	1.191	0.313	0.185	0.540	0.481	0.744	1.028	0.398
Braunschweiger (15.4% protein)...	0.172	0.668	0.754	1.291	1.200	0.320	0.187	0.700	0.471	0.956	0.954	0.458
frankfurters (14.2% protein)....	0.120	0.582	0.688	1.018	1.143	0.300	0.177	0.518	0.461	0.713	0.986	0.382
head cheese (15.0% protein)....	0.079	0.418	0.509	0.946	0.907	0.250	0.209	0.569	0.569	0.617	1.075	0.278
liverwurst (16.7% protein).....	0.187	0.724	0.818	1.400	1.301	0.347	0.203	0.759	0.510	1.037	1.034	0.497
pork, links or bulk, raw (10.8% protein).....	0.092	0.442	0.524	0.774	0.869	0.228	0.135	0.394	0.351	0.543	0.750	0.290
pork, bulk, canned (15.4% pro- tein).....	0.131	0.631	0.747	1.104	1.239	0.325	0.192	0.562	0.500	0.774	1.069	0.414
salami (23.9% protein).....	0.203	0.979	1.159	1.713	1.923	0.505	0.298	0.872	0.776	1.201	1.660	0.642
Vienna sausage, canned (15.8% protein).....	0.134	0.647	0.766	1.133	1.272	0.334	0.197	0.576	0.513	0.794	1.097	0.425
tongue:												
beef (16.4% protein).....	0.197	0.708	0.792	1.286	1.364	0.357	0.207	0.661	0.548	0.840	1.065	0.412
pork (16.8% protein).....	0.202	0.726	0.812	1.317	1.398	0.366	0.212	0.677	0.562	0.860	1.091	0.422
veal and pork loaf, canned (17.2% protein).....	0.198	0.627	0.859	1.236	1.258	0.418	0.209	0.619	0.468	0.958	0.916	0.388
LEGUMES (DRY SEED); COMMON NUTS; OTHER NUTS AND DRY SEEDS; THEIR PRODUCTS:												
Legume seeds and their products:												
beans (<i>Phaseolus vulgaris</i>) (NX 6.25):												
pinto and red Mexican (23.0% protein).....	0.213	0.997	1.306	1.976	1.708	0.232	0.228	1.270	0.887	1.395	1.384	0.655
red kidney:												
raw (23.1% protein).....	0.214	1.002	1.312	1.985	1.715	0.233	0.229	1.275	0.891	1.401	1.390	0.658
canned, solids and liquid (5.7% protein).....	0.053	0.247	0.324	0.490	0.423	0.057	0.057	0.315	0.220	0.346	0.343	0.162

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
LEGUMES; SEEDS; NUTS—Continued												
other common beans including												
navy, pea bean, white marrow:												
raw (21.4% protein).....	0.199	0.928	1.216	1.839	1.589	0.216	0.212	1.181	0.825	1.298	1.287	0.609
baked with pork, canned (5.8% protein).....	0.057	0.274	0.291	0.486	0.354	0.059	0.018	0.333	0.165	0.312	0.251	0.186
black gram, raw (23.6% protein, N×6.25).....	0.242	0.801	1.390	2.062	1.510	0.332	0.287	1.242	0.551	1.450	1.552	0.559
broad beans, raw (25.4% protein, N×6.25).....	0.236	0.829	1.593	2.211	1.426	0.106	0.179	1.057	0.687	1.276	1.780	0.748
chickpeas (20.8% protein, N±6.25)	0.170	0.739	1.195	1.538	1.434	0.276	0.296	1.012	0.692	1.025	1.551	0.559
cowpeas (22.9% protein, N×6.25)...	0.220	0.901	1.110	1.715	1.491	0.352	0.297	1.198	0.678	1.293	1.473	0.692
dolichos, twinflower (21.6% protein, N×6.25).....	0.221	0.836	1.448	1.707	1.700	0.294	0.480	1.486	0.560	1.286	1.230	0.650
lentils, whole (25.0% protein, N× 6.25).....	0.216	0.896	1.316	1.760	1.528	0.180	0.204	1.104	0.664	1.360	1.908	0.548
lima beans (20.7% protein, N×6.25)	0.195	0.980	1.199	1.722	1.378	0.331	0.311	1.222	0.543	1.298	1.315	0.669
lupine (32.3% protein, N×6.25)....	.....	1.101	1.618	1.964	1.447	0.114	.....	1.271	.....	1.328	2.718	0.811
moth beans (24.4% protein, N× 6.25).....	0.164	.....	1.093	1.484	1.202	0.191	0.109	1.003	1.245	0.695	.....	0.722
mung beans (24.4% protein, 6.25).....	0.180	0.765	1.351	2.202	1.667	0.265	0.152	1.167	0.390	1.444	1.370	0.543
peanuts (26.9% protein, N×5.46)...	0.340	0.828	1.266	1.872	1.099	0.271	0.463	1.557	1.104	1.532	3.296	0.749
peanut flour (51.2% protein, N× 5.46).....	0.647	1.575	2.410	3.563	2.091	0.516	0.881	2.963	2.100	2.916	6.273	1.425
peanut butter (26.1% protein, N× 5.46).....	0.330	0.803	1.228	1.816	1.066	0.263	0.449	1.510	1.071	1.487	3.198	0.727

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
LEGUMES; SEEDS; NUTS—Continued												
peas (<i>Pisum sativum</i>) (N×6.25):												
entire seeds (23.8% protein).....	0.251	0.918	1.340	1.969	1.744	0.286	0.308	1.200	0.960	1.333	2.102	0.651
split (24.5% protein).....	0.259	0.945	1.380	2.027	1.795	0.294	0.318	1.235	0.988	1.372	2.164	0.670
pigeonpeas, without seed coat (21.9% protein, N×6.25).....	0.119	0.834	1.346	1.717	1.580	0.256	0.308	1.875	0.725	1.153	1.489	0.617
soybeans, whole (34.9% protein, N×5.71).....	0.526	1.504	2.054	2.946	2.414	0.513	0.678	1.889	1.216	2.005	2.763	0.911
soybean flour, flakes, and grits (pro- tein, N×5.71):												
low fat (44.7% protein).....	0.673	1.926	2.630	3.773	3.092	0.658	0.869	2.419	1.558	2.568	3.538	1.166
medium fat (42.5% protein).....	0.640	1.831	2.501	3.588	2.940	0.625	0.826	2.300	1.481	2.441	3.364	1.109
full fat (35.9% protein).....	0.541	1.547	2.112	3.030	2.483	0.528	0.698	1.943	1.251	2.062	2.842	0.937
soybean curd (7.0% protein, N× 5.71).....	.....	.....	.....	.....	.....	0.081	0.091	.....	.....	.....	.....	.....
soybean milk (3.4% protein, N× 5.71).....	0.051	0.176	0.175	0.305	0.269	0.054	0.071	0.195	0.193	0.186	0.302	0.121
vetch (28.8% protein, N×6.25)....	0.203	0.899	2.198	2.290	1.898	0.346	0.336	1.014	0.369	1.442	2.249	0.659
Common nuts and their products:												
almonds (18.6 protein, N×5.18)....	0.176	0.610	0.873	1.454	0.582	0.259	0.377	1.146	0.618	1.124	2.729	0.517
Brazil nuts (14.4% protein, N× 5.46).....	0.187	0.422	0.593	1.129	0.443	0.941	0.504	0.617	0.483	0.823	2.247	0.367
cashews (18.5% protein, N×5.30)...	0.471	0.737	1.222	1.522	0.792	0.353	0.527	0.946	0.712	1.592	2.098	0.415
coconut (3.4% protein, N×5.30)....	0.033	0.129	0.180	0.269	0.152	0.071	0.062	0.174	0.101	0.212	0.486	0.069
coconut meal (20.3% protein, N× 5.30).....	0.199	0.770	1.076	1.605	0.908	0.421	0.372	1.038	0.605	1.268	2.899	0.414
filberts (12.7% protein, N×5.30)...	0.211	0.415	0.853	0.939	0.417	0.139	0.165	0.537	0.434	0.934	2.171	0.288
peanuts. <i>See</i> Legumes.												
pecans (9.4% protein, N×5.30)....	0.138	0.389	0.553	0.773	0.435	0.153	0.216	0.564	0.316	0.525	1.185	0.273
walnuts (English or Persian) (15.0% protein, N×5.30).....	0.175	0.589	0.767	1.228	0.441	0.306	0.320	0.767	0.583	0.974	2.287	0.405

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
LEGUMES; SEEDS; NUTS—Continued												
<i>Other nuts and seeds and their products</i> (Protein N×5:30):												
acorns (10.4% protein).....	0.126	0.434	0.561	0.808	0.636	0.139	0.184	0.473	.....	0.718	0.722	0.251
amaranth (14.6% protein).....	0.149	0.832	0.882	1.209	1.074	0.372	0.521	1.141	.....	0.849	1.747	0.441
balsam pear seed meal (41.9% pro- tein).....	.....	.....	.....	.....	1.265	.....	0.142	2.609	0.617	.....	5.914	0.917
breadnut tree, Ramon (9.6% pro- tein).....	0.261	0.373	0.543	1.041	0.418	0.056	.....	0.453	.....	0.927	0.884	0.147
Chinese tallow tree-nut flour (57.6% protein).....	0.837	2.174	3.510	4.347	1.587	0.924	0.696	2.847	2.011	4.510	10.031	1.587
chocolate tree, Nicaragua (38.5% protein).....	0.588	1.496	2.092	3.952	2.223	0.276	.....	2.630	.....	2.404	4.220	0.683
cottonseed flour and meal (42.3% protein).....	0.591	1.764	1.884	2.945	2.139	0.686	0.814	2.610	1.365	2.458	5.603	1.325
earpod tree, 'Guanacaste (34.1% protein).....	0.444	1.165	2.213	4.581	1.930	0.360	.....	1.325	.....	1.570	2.857	1.004
lead tree (24.1% protein).....	0.191	0.828	1.651	1.787	1.164	0.055	.....	0.855	.....	0.864	2.410	0.564
pumpkin seed (30.9% protein).....	0.560	0.933	1.737	2.437	1.411	0.577	.....	1.749	.....	1.679	4.810	0.711
safflower seed meal (42.1% protein)	0.675	1.462	1.914	2.740	1.525	0.731	.....	2.605	.....	2.446	4.623	0.985
sesame:												
seed (19.3% protein).....	0.331	0.707	0.951	1.679	0.583	0.637	0.495	1.457	0.951	0.885	1.992	0.441
meal (33.4% protein).....	0.573	1.223	1.645	2.905	1.008	1.103	0.857	2.521	1.645	1.531	3.447	0.763
sunflower:												
kernel (23.0% protein).....	0.343	0.911	1.276	1.736	0.868	0.443	0.464	1.220	0.647	1.354	2.370	0.586
meal (39.5% protein).....	0.589	1.565	2.191	2.981	1.491	0.760	0.797	2.094	1.110	2.325	4.069	1.006

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
GRAINS AND THEIR PRODUCTS												
Barley (12.8% protein, N×5.83) . . .	0.160	0.433	0.545	0.889	0.433	0.184	0.257	0.661	0.466	0.643	0.659	0.239
Bread, white (4% non-fat dry milk, flour basis) (8.5% protein, N×5.70)	0.091	0.282	0.429	0.668	0.225	0.142	0.200	0.465	0.243	0.435	0.340	0.192
Buckwheat flour:												
dark (11.7% protein, N×6.25) . . .	0.165	0.461	0.440	0.683	0.687	0.206	0.228	0.442	0.240	0.607	0.930	0.256
light (6.4% protein, N×6.25) . . .	0.090	0.252	0.241	0.374	0.376	0.113	0.125	0.242	0.131	0.332	0.509	0.140
Cañihua (14.7% protein, N×6.25) . . .	0.118	0.706	1.000	0.851	0.882	0.263	0.162	0.529	0.294	0.677	1.162	0.367
Cereal combinations:												
corn and soy grits (18.0% protein, N×6.25)	0.161	0.792	0.841	1.656	0.772	0.271	0.311	0.832	0.562	1.054	0.982	0.472
infant food, precooked, mixed cere- als with non-fat dry milk and yeast (19.4% protein, N×6.25) . .	0.118				0.273	0.310	0.137	0.543	0.447		0.447	0.233
oat-corn-rye mixture, puffed (14.5% protein, N×5.83)	0.172	0.545	0.841	1.368	0.343	0.388	0.234	0.933	0.622	0.900	0.776	0.326
Corn, field (10.0% protein, N×6.25) . .	0.061	0.398	0.462	1.296	0.288	0.186	0.130	0.454	0.611	0.510	0.352	0.206
Corn flour (7.8% protein, N×6.25) . . .	0.047	0.311	0.361	1.011	0.225	0.145	0.101	0.354	0.477	0.398	0.275	0.161
Corn grits (8.7% protein, N×6.25) . . .	0.053	0.347	0.402	1.128	0.251	0.161	0.113	0.395	0.532	0.444	0.306	0.180
Cornmeal:												
whole ground (9.2% protein, N× 6.25)	0.056	0.367	0.425	1.192	0.265	0.171	0.119	0.418	0.562	0.470	0.324	0.190
de-germed (7.9% protein, N×6.25) .	0.048	0.315	0.365	1.024	0.228	0.147	0.102	0.359	0.483	0.403	0.278	0.163
Corn products:												
flakes (8.1% protein, N×6.25) . . .	0.052	0.275	0.306	1.047	0.154	0.135	0.152	0.354	0.283	0.386	0.231	0.226
germ (14.5% protein, N×6.25) . . .	0.144	0.622	0.578	1.030	0.791	0.232	0.130	0.483	0.343	0.789	1.134	0.464
gluten (10.0% protein, N×6.25) . . .	0.059	0.344	0.443	1.563	0.179	0.282	0.141	0.558	0.582	0.512	0.322	0.200
hominy (8.7% protein, N×6.25) . . .	0.084	0.316	0.349	0.810	0.358	0.099		0.333	0.331	0.398	0.444	0.203
masa (2.8% protein, N×6.25) . . .	0.010				0.103	0.108	0.030					
pozol (5.9% protein, N×6.25) . . .	0.042	0.336	0.304	0.591	0.234	0.087		0.254		0.267	0.107	0.122
tortilla (5.8% protein, N×6.25) . . .	0.031	0.235	0.345	0.939	0.145	0.111		0.252		0.304	0.223	0.128
zein (16.1% protein, N×6.25) . . .	0.010	0.495	0.822	3.184		0.281	0.162	1.664	0.981	0.654	0.286	0.216
Job's tears (13.8% protein, N×5.83) . .	0.066	0.620	1.065	3.506	0.362	0.459	0.265	0.703			0.518	0.317

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
<i>GRAINS AND PRODUCTS—Continued</i>												
<i>Millets:</i>												
foxtail millet (9.7% protein, N× 5.83).....	0.103	0.323	0.790	1.737	0.218	0.291	.....	0.697	.....	0.717	0.374	0.218
little millet (7.2% protein, N×5.83) pearl millet (11.4% protein, N× 5.83).....	0.047	0.262	0.517	0.841	0.138	0.178	.....	0.370	.....	0.471	0.363	0.147
ragimillet (6.2% protein, N×5.83). Oatmeal and rolled oats (14.2% pro- tein, N×5.83).....	0.248	0.456	0.635	1.746	0.383	0.270	0.152	0.506	.....	0.682	0.524	0.240
Quinoa (11.0% protein, N×6.25)....	0.085	0.270	0.398	0.620	0.202	0.270	0.187	0.263	.....	0.473	0.100	0.079
<i>Rice:</i>												
brown (7.5% protein, N×5.95)....	0.183	0.470	0.733	1.065	0.521	0.209	0.309	0.758	0.524	0.845	0.935	0.261
white and converted (7.6% protein, N×5.95).....	0.120	0.523	0.722	0.781	0.729	0.278	0.107	0.394	0.253	0.447	0.820	0.297
<i>Rice products:</i>												
flakes or puffed (5.9% protein, N× 5.95).....	0.081	0.294	0.352	0.646	0.296	0.135	0.102	0.377	0.343	0.524	0.432	0.126
germ (14.2% protein, N×5.95)....	0.082	0.298	0.356	0.655	0.300	0.137	0.103	0.382	0.347	0.531	0.438	0.128
Rye (12.1% protein, N×5.83).....	0.046	.....	.....	.....	0.056	.....	0.044	0.286	0.124	.....	0.137	0.137
Rye flour: light (9.4% protein, N×5.83).....	0.270	2.177	0.630	0.838	1.707	0.420	0.169	0.750	0.929	0.938	1.559	0.430
medium (11.4% protein, N×5.83). Sorghum (11.0% protein, N×6.25).. Teosinte (22.0% protein, N×6.25)....	0.137	0.448	0.515	0.813	0.494	0.191	0.241	0.571	0.390	0.631	0.591	0.276
Wheat, whole grain: hard red spring (14.0% protein, N× 5.83).....	0.106	0.348	0.400	0.632	0.384	0.148	0.187	0.443	0.303	0.490	0.459	0.214
hard red winter (12.3% protein, N 5.83).....	0.129	0.422	0.485	0.766	0.465	0.180	0.227	0.538	0.368	0.594	0.557	0.260
soft red winter (10.2% protein, N× 5.83).....	0.123	0.394	0.598	1.767	0.299	0.190	0.183	0.547	0.303	0.628	0.417	0.211
white (9.4% protein, N×5.83).... durum (12.7% protein, N×5.83)...	0.049	.....	.....	.....	0.348	0.496	.....	.....	.....	.....	.....	.....
<i>Wheat, whole grain:</i>												
hard red spring (14.0% protein, N× 5.83).....	0.173	0.403	0.607	0.939	0.384	0.214	0.307	0.691	0.523	0.648	0.670	0.286
hard red winter (12.3% protein, N 5.83).....	0.152	0.354	0.534	0.825	0.338	0.188	0.270	0.608	0.460	0.570	0.589	0.251
soft red winter (10.2% protein, N× 5.83).....	0.126	0.294	0.443	0.684	0.280	0.156	0.224	0.504	0.382	0.472	0.488	0.208
white (9.4% protein, N×5.83).... durum (12.7% protein, N×5.83)...	0.116	0.271	0.408	0.630	0.258	0.143	0.206	0.464	0.351	0.435	0.450	0.192
	0.157	0.366	0.551	0.852	0.348	0.194	0.279	0.627	0.475	0.588	0.608	0.259

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
GRAINS AND PRODUCTS—Continued												
Wheat flour:												
whole grain (13.3% protein, N×5.83).....	0.164	0.383	0.577	0.892	0.365	0.203	0.292	0.657	0.497	0.616	0.636	0.271
intermediate extraction (12.0% protein, N×5.70).....	.....	0.392	0.619	0.924	0.356	0.198	0.320	0.732	0.335	0.583	0.549	0.286
white (10.5% protein, N×5.70)....	0.129	0.302	0.483	0.809	0.239	0.138	0.210	0.577	0.359	0.453	0.466	0.210
Wheat products:												
bran (12.0% protein, N×6.31).....	0.196	0.342	0.485	0.717	0.491	0.145	0.270	0.434	0.259	0.552	0.742	0.280
burghul (12.4% protein, N×5.83)...	0.070	.....	.....	.....	0.430	0.300	0.319	.....	.....	.....	.....	.....
farina (10.9% protein, N×5.70)....	0.124	.....	.....	.....	0.199	0.143	0.184	0.579	0.447	.....	0.424	0.268
flakes (10.8% protein, N×5.70)...	0.121	0.356	0.496	0.891	0.360	0.127	0.191	0.478	0.311	0.572	0.559	0.231
germ (25.2% protein, N×5.80).....	0.265	1.343	1.177	1.708	1.534	0.404	0.287	0.908	0.882	1.364	1.825	0.687
gluten, commercial (80.0% protein, N×5.70).....	0.856	2.119	3.677	5.993	1.530	1.389	1.726	4.351	2.596	3.789	3.481	1.825
gluten flour (41.4% protein, N×5.70).....	0.443	1.097	1.903	3.101	0.792	0.719	0.893	2.252	1.344	1.961	1.801	0.944
macaroni or spaghetti (12.8% protein, N×5.70).....	0.150	0.499	0.642	0.849	0.413	0.193	0.243	0.669	0.422	0.728	0.582	0.303
noodles, containing egg solids (12.6% protein, N×5.70).....	0.133	0.533	0.621	0.834	0.411	0.212	0.245	0.610	0.312	0.745	0.621	0.301
Shredded Wheat (10.1% protein, N×5.83).....	0.085	0.405	0.449	0.684	0.331	0.139	0.204	0.481	0.236	0.577	0.523	0.236
whole wheat with added germ (12.8% protein, N×5.83).....	0.136	.....	.....	.....	0.466	.....	0.246	0.755	0.481	.....	0.742	0.371
FRUITS (Protein, N×6.25)												
Abiu (1.7% protein).....	0.028	.....	.....	.....	0.085	0.013	.....	.....	.....	.....	.....	.....
Avocados (1.3% protein).....	0.014	.....	.....	.....	0.074	0.012	.....	.....	.....	.....	.....	.....
Bananas ripe												
common (1.2% protein).....	0.018	.....	.....	.....	0.055	0.011	.....	.....	0.031	.....	.....	.....
dwarf (1.2% protein).....	0.012	.....	.....	.....	0.049	0.004	.....	.....	.....	.....	.....	.....
Dates (2.2% protein).....	0.061	0.061	0.074	0.077	0.065	0.027	.....	0.063	.....	0.094	0.049	0.049

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
FRUITS—Continued												
Grapefruit (0.5% protein).....	0.001	.....	.....	.....	0.006	0.000	.....	.....	.....	.....	.....	.....
Guavas, common (1.0% protein).....	0.010	.....	.....	.....	0.030	0.010	.....	.....	.....	.....	.....	.....
Limes (0.8% protein).....	0.003	.....	.....	.....	0.015	0.002	.....	.....	.....	.....	.....	.....
Mamey (0.5% protein).....	0.006	.....	.....	.....	0.040	0.007	.....	.....	.....	.....	.....	.....
Mangos (0.7% protein).....	0.014	.....	.....	.....	0.093	0.008	.....	.....	.....	.....	.....	.....
Muskmelons (0.6% protein).....	0.001	.....	.....	.....	0.015	0.002	.....	.....	.....	.....	.....	.....
Oranges, sweet (0.9% protein).....	0.003	.....	.....	.....	0.024	0.003	.....	.....	.....	.....	.....	.....
Orange juice (0.8% protein).....	0.003	.....	.....	.....	0.021	0.002	.....	.....	.....	.....	.....	.....
Oranges, mandarin including tanger- ines (0.8% protein).....	0.005	.....	.....	.....	0.028	0.004	.....	.....	.....	.....	.....	.....
Papayas (0.6% protein).....	0.012	.....	.....	.....	0.038	0.002	.....	.....	.....	.....	.....	.....
Pineapple (0.4% protein).....	0.005	.....	.....	.....	0.009	0.001	.....	.....	.....	.....	.....	.....
Plantain or baking banana (1.1% pro- tein).....	0.010	0.027	0.056	0.059	0.050	0.005	0.016	0.049	.....	0.065	0.045	.....
Soursop (1.0% protein).....	0.011	.....	.....	.....	0.060	0.007	.....	.....	.....	.....	.....	.....
Sugarapple (1.8% protein).....	0.009	.....	.....	.....	0.071	0.008	.....	.....	.....	.....	.....	.....
VEGETABLES												
<i>Immature seeds (Protein, N×6.25):</i>												
corn, sweet, white or yellow:												
raw (3.7% protein).....	0.023	0.151	0.137	0.407	0.137	0.072	0.062	0.207	0.124	0.231	0.174	0.095
canned, solids and liquid (2.0% protein).....	0.012	0.082	0.074	0.220	0.074	0.039	0.033	0.112	0.067	0.125	0.094	0.052
cowpeas (9.4% protein).....	0.099	0.353	0.465	0.653	0.617	0.131	.....	0.523	.....	0.513	0.615	0.310
lima beans:												
raw (7.5% protein).....	0.097	0.338	0.460	0.605	0.474	0.080	0.083	0.389	0.259	0.485	0.454	0.247
canned, solids and liquid (3.8% protein).....	0.049	0.171	0.233	0.306	0.240	0.041	0.042	0.197	0.131	0.246	0.230	0.125
peas:												
raw (6.7% protein).....	0.056	0.245	0.308	0.418	0.316	0.054	0.073	0.257	0.163	0.274	0.595	0.109
canned, solids and liquid (3.4% protein).....	0.028	0.125	0.156	0.212	0.160	0.027	0.037	0.131	0.083	0.139	0.302	0.055

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
VEGETABLES—Continued												
<i>Leafy vegetables, raw (Protein, N X 6.25):</i>												
amaranth (3.5% protein).....	0.038	0.056	0.164	0.206	0.141	0.025	0.024	0.096	0.105	0.136	0.134	0.069
beet greens (2.0% protein).....	0.024	0.076	0.084	0.129	0.108	0.034	.....	0.116	.....	0.101	0.083	0.026
Brussels sprouts (4.4% protein).....	0.044	0.153	0.186	0.194	0.197	0.046	.....	0.148	.....	0.193	0.279	0.106
cabbage (1.4% protein).....	0.011	0.039	0.040	0.057	0.066	0.013	0.028	0.030	0.030	0.043	0.105	0.025
chard (1.4% protein).....	0.014	0.058	0.060	0.076	0.055	0.004	.....	0.046	.....	0.055	0.035	0.018
chicory (1.6% protein).....	0.024	.....	.....	.....	0.052	0.016	0.006	.....	0.040	.....	.....	0.024
collards (3.9% protein).....	0.055	0.114	0.121	0.218	0.202	0.046	0.059	0.124	0.151	0.195	0.258	0.087
kale (3.9% protein).....	0.042	0.139	0.133	0.252	0.121	0.035	0.036	0.158	.....	0.184	0.202	0.062
lettuce (1.2% protein).....	0.012	.....	.....	.....	0.070	0.004	.....	.....	.....	.....	.....	.....
mustard greens (2.3% protein).....	0.037	0.060	0.075	0.062	0.111	0.024	0.035	0.074	0.121	0.108	0.167	0.041
parsley, curly garden (2.5% protein).....	0.050	.....	.....	.....	0.160	0.012	.....	.....	.....	.....	.....	.....
spinach (2.3% protein).....	0.037	0.102	0.107	0.176	0.142	0.039	0.046	0.099	0.073	0.126	0.116	0.049
turnip greens (2.9% protein).....	0.045	0.125	0.107	0.207	0.129	0.052	0.045	0.146	0.105	0.149	0.167	0.051
watercress (1.7% protein).....	0.028	0.084	0.076	0.131	0.091	0.010	.....	0.062	0.036	0.084	0.053	0.034
<i>Starchy roots and tubers (Protein, N X 6.25):</i>												
<i>Apio arracacia</i> (1.2% protein).....	0.008	.....	.....	.....	0.042	0.003	.....	.....	.....	.....	.....	.....
cassava:												
flour (1.6% protein).....	0.021	0.044	0.045	0.066	0.066	0.010	0.018	0.045	0.030	0.049	0.159	0.025
root (1.1% protein).....	0.014	0.030	0.031	0.045	0.045	0.007	0.012	0.031	0.021	0.033	0.110	0.017
potatoes:												
raw (2.0% protein).....	0.021	0.079	0.088	0.100	0.107	0.025	0.019	0.088	0.036	0.107	0.009	0.029
canned, solids and liquid (1.7% protein).....	0.018	0.067	0.075	0.085	0.091	0.021	0.016	0.075	0.030	0.091	0.084	0.024
flour (7.1% protein).....	0.076	0.279	0.311	0.353	0.378	0.089	0.068	0.314	0.127	0.379	0.350	0.102

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
<i>VEGETABLES—Continued</i>												
sweet potatoes (<i>Ipomaea batatas</i>):												
raw (1.8% protein).....	0.031	0.085	0.087	0.103	0.085	0.033	0.029	0.100	0.081	0.135	0.094	0.036
dehydrated (5.0% protein).....	0.087	0.235	0.241	0.286	0.236	0.093	0.080	0.278	0.225	0.374	0.261	0.099
taro (1.9% protein).....	0.035	0.089	0.099	0.169	0.110	0.021	.....	0.099	.....	0.114	0.118	0.032
yam (<i>Dioscorea</i> spp.) (2.1% protein)	0.035	.....	.....	.....	0.110	0.034	.....	.....	.....	.....	.....	.....
<i>Yautia malanga</i> (1.7% protein).....	0.023	.....	.....	.....	0.067	0.016	.....	.....	.....	.....	.....	.....
<i>Other vegetables (Protein, N X 6.25):</i>												
asparagus:												
raw (2.2% protein).....	0.027	0.066	0.080	0.096	0.103	0.032	.....	0.069	.....	0.106	0.123	0.036
canned, solids and liquid (1.9% protein).....	0.023	0.057	0.069	0.083	0.089	0.027	.....	0.060	.....	0.092	0.106	0.031
beans, snap:												
raw (2.4% protein).....	0.033	0.091	0.109	0.139	0.126	0.035	0.024	0.057	0.050	0.115	0.101	0.045
canned, solids and liquid (1.0% protein).....	0.014	0.038	0.045	0.058	0.052	0.014	0.010	0.024	0.021	0.048	0.042	0.019
beets:												
raw (1.6% protein).....	0.014	0.034	0.051	0.055	0.086	0.006	.....	0.027	.....	0.049	0.028	0.022
canned, solids and liquid (0.9% protein).....	0.008	0.019	0.029	0.031	0.048	0.003	.....	0.015	.....	0.028	0.016	0.012
broccoli (3.3% protein).....	0.037	0.122	0.126	0.163	0.147	0.050	.....	0.119	.....	0.170	0.192	0.063
carrots:												
raw (1.2% protein).....	0.010	0.043	0.046	0.065	0.052	0.010	0.029	0.042	0.020	0.056	0.041	0.017
canned, solids and liquid (0.5% protein).....	0.004	0.018	0.019	0.027	0.022	0.004	0.012	0.018	0.008	0.023	0.017	0.007
cauliflower (2.4% protein).....	0.033	0.102	0.104	0.162	0.134	0.047	.....	0.075	0.034	0.144	0.110	0.048
celery (1.3% protein).....	0.012	.....	.....	.....	0.021	0.015	0.006	.....	0.016	.....	.....	.....
chayote (0.6% protein).....	0.008	.....	.....	.....	0.038	0.001	.....	.....	.....	.....	.....	.....
cowpeas, yardlong, immature pod (3.4% protein).....	0.034	.....	.....	.....	0.203	0.021	.....	.....	.....	.....	.....	.....
cucumbers (0.7% protein).....	0.005	0.019	0.022	0.030	0.031	0.007	.....	0.016	.....	0.024	0.053	0.001
cushaw (1.5% protein).....	0.014	.....	.....	.....	0.044	0.008	.....	.....	.....	.....	.....	.....
eggplant (1.1% protein).....	0.010	0.038	0.056	0.068	0.030	0.006	.....	0.048	.....	0.065	0.037	0.019
mallow (3.7% protein).....	0.144	0.155	.....	0.259	0.155	0.030	.....	0.166	.....	0.181	0.189	0.063

TABLE 43—Continued

Protein Content, and Nitrogen Conversion Factor	Trypto- phan (Gm.)	Threo- nine (Gm.)	Iso- leucine (Gm.)	Leucine (Gm.)	Lysine (Gm.)	Methi- onine (Gm.)	Cystine (Gm.)	Phenyl- alanine (Gm.)	Tyro- sine (Gm.)	Valine (Gm.)	Argi- nine (Gm.)	Histi- dine (Gm.)
VEGETABLES—Continued												
mushrooms:												
(<i>Agaricus campestris</i>)*	0.006	.....	0.532	0.281	.....	0.167	.....	.....	.....	0.378	0.235	.....
(<i>Lactarius</i> spp.)†	0.006	0.156	0.201	0.139	0.088	0.021	.....	0.018	.....	0.116	0.021	0.027
okra (1.8% protein)	0.018	0.066	0.069	0.101	0.076	0.022	0.017	0.065	0.079	0.091	0.093	0.030
onions, mature (1.4% protein)	0.021	0.022	0.021	0.037	0.064	0.013	.....	0.039	0.046	0.031	0.180	0.014
peppers (1.2% protein)	0.009	0.050	0.046	0.046	0.051	0.016	.....	0.055	.....	0.033	0.024	0.014
prickly pears (1.1% protein)	0.009	0.053	0.044	0.057	0.044	0.008	.....	0.059	.....	0.041	0.032	0.016
pumpkin (1.2% protein)	0.016	0.028	0.044	0.063	0.058	0.011	.....	0.032	0.016	0.045	0.043	0.019
radishes (1.2% protein)	0.005	0.059	.....	.....	0.034	0.002	.....	.....	.....	0.030	.....	.....
seepweed (2.6% protein)	0.027	0.089	0.113	0.152	0.089	0.013	.....	0.116	.....	0.091	0.062	0.036
soybean sprouts (6.2% protein)	.....	0.159	0.225	0.265	0.211	0.045	.....	0.186	.....	0.225	0.225	0.133
squash, summer (0.6% protein)	0.005	0.014	0.019	0.027	0.023	0.008	.....	0.016	.....	0.022	0.027	0.009
tomatoes and cherry tomatoes (1.0% protein)												
turnips (1.1% protein)	0.009	0.033	0.029	0.041	0.042	0.007	.....	0.028	0.014	0.028	0.029	0.015
waxgourd, Chinese (0.4% protein)	0.002	.....	0.020	.....	0.057	0.012	.....	0.020	0.029	.....	.....	.....
MISCELLANEOUS FOOD ITEMS												
Vegetable patty or steak (principally wheat protein) (15% protein, NX 5.70)	0.142	0.411	0.884	1.079	0.321	0.253	.....	0.811	.....	0.705	0.597	0.321
Yeast:												
baker's, compressed† (NX 6.25)	0.122	0.655	0.655	1.151	0.914	0.248	0.120	0.607	0.580	0.840	0.536	0.353
brewer's, dried§ (NX 6.25)	0.710	2.353	2.398	3.226	3.300	0.836	0.548	1.902	1.902	2.723	2.250	1.251
primary, dried:												
(<i>Saccharomyces cerevisiae</i>)§												
(NX 6.25)	0.636	2.353	2.708	3.300	3.337	0.851	0.444	1.813	2.472	2.553	1.931	1.103
(<i>Torulopsis utilis</i>)§ (NX 6.25)	0.636	2.331	3.323	3.707	3.648	0.710	0.422	2.361	2.464	2.901	3.337	1.251

* Total nitrogen is 0.58%. This is equivalent to 2.4% protein on the basis that two-thirds of the nitrogen is protein nitrogen. If total nitrogen is used for the calculation, the protein content is 3.6%.

† Total nitrogen is 0.69%. This is equivalent to 2.9% protein on the basis that two-thirds of the nitrogen is protein nitrogen. If total nitrogen is used for the calculation, the protein content is 4.3%.

‡ Total nitrogen is 2.1%. This is equivalent to 10.6% protein on the basis that four-fifths of the nitrogen is protein nitrogen. If total nitrogen is used for the calculation, the protein content is 13.1%.

§ Total nitrogen is 7.4%. This is equivalent to 36.9% protein on the basis that four-fifths of the nitrogen is protein nitrogen. If total nitrogen is used for the calculation, the protein content is 46.1%.

APPENDIX 7

SODIUM AND POTASSIUM CONTENT OF FOODS AND PUBLIC WATER SUPPLIES

TABLE 44*
SODIUM CONTENT OF FOODS

Food	Sodium (Mg/100 Gm)	Food	Sodium (Mg/100 Gm)
Almonds, unsalted.....	3	Cabbage, raw.....	15
Apples, raw.....	1	Candy.....	Variable†
cider.....	1	Cantaloupe.....	13
sauce, canned.....	2†	Carrots, raw.....	50
Apricots, raw.....	1	canned without added sodium.....	35†
unpeeled, canned.....	4†	Cauliflower, raw.....	20
dried.....	10†	frozen.....	20
Asparagus, raw.....	3	Celery.....	100
canned without added sodium.....	4†	Cereals, dry:	
Avocado, raw.....	3	"All-Bran".....	1,400
Bacon, raw, cured.....	700††	corn flakes.....	660
fried crisp.....	2,400††	"Cream of Wheat," plain.....	2
Baking powder, ordinary (av.).....	9,000†	"Cream of Wheat," quick-cooking, enriched.....	90
Bananas.....	1	Farina, unsalted.....	2
Barley, pearled.....	3	"Grape-Nuts".....	660
Beans, dry, (Navy, pea, etc.).....	1	"Instant Ralston".....	1
Beans, lima, raw.....	1	"Maltex".....	4
lima, frozen.....	Variable†	"Muffets".....	4
lima, canned without added so- dium.....	2†	"Pabena".....	640
Beans, snap, green and yellow wax, raw.....	1	"Pabulum".....	620
Beans, snap, green and yellow wax, frozen.....	2	"Pettijohn's".....	2
Beans, snap, green and yellow wax, canned without added sodium.....	2†	rice flakes.....	720
Beef, lean, muscle, raw.....	70	rice, puffed.....	1
Beef heart, raw.....	85	rolled oats.....	2
Beef kidney, raw.....	200†	wheat, cracked.....	1
Beef liver, raw.....	130†	wheat germ, malt-flavored, "Zing".....	9
Beef tongue, raw, unsmoked.....	80	wheat flakes.....	1,300
Beets, raw.....	60†	wheat flakes, unsalted.....	2
canned without added sodium.....	40†	wheat, puffed.....	4
Beet greens, raw.....	130	wheat, shredded.....	2
Beverages:		"Wheatena".....	2
beer.....	7†	Chard, raw.....	100†
soft drinks (Cola drinks, fruit soda, ginger ale, root beer, etc.).....	7†	Cheese, Cheddar.....	700†
wine (average).....	7†	cottage.....	290†
Blackberries, raw.....	1	cottage, unsalted (curd).....	20†
canned.....	1†	cream, Philadelphia.....	250†
Blueberries, raw.....	1	process.....	1,500†
canned.....	1†	Swiss, domestic.....	700†
Bread, rye.....	600††	Cherries, raw.....	2
rye, unsalted.....	30††	frozen.....	2
Bread, white, enriched.....	600††	canned.....	2†
white, unsalted.....	30††	Chicken (av. light and dark meat).....	75†
Bread, whole wheat.....	600††	Chocolate, bitter.....	10
whole wheat, unsalted.....	30††	Cocoa, Dutch process.....	60†
Broccoli, raw.....	15	plain, "Hershey".....	5
frozen.....	15	Coconut, raw.....	30
Brussels sprouts, raw.....	12	dried, shredded.....	20
frozen.....	12	Coffee, roasted, dry.....	2
Butter, salted.....	1,000††	Corn, dry, white.....	1
unsalted, or sweet.....	10††	dry, yellow.....	1
Buttermilk, cultured.....	130	sweet, raw.....	1
		sweet, canned without added so- dium.....	2†
		Corn meal.....	2
		Crackers.....	Variable†
		Graham.....	710

* Estimated Best Values from Sodium Restricted Diets ("Food and Nutrition Board, National Research Council, Publications," No. 325 [1954]).

† The estimated sodium values may be altered by various factors such as (1) a high-sodium packing water in the case of canned foods, (2) quality separation by means of brine in the case of canned and frozen peas, lima beans, etc., (3) lye peeling (canned peaches, citrus fruits, apricots, beets, tomatoes), (4) variation in the amounts of sodium chloride or sodium-containing compounds added during manufacture (bread, cookies, cheese, meats, etc.). The figures for canned foods also apply to the glass-packed product. Many foods are specially prepared for use in low-sodium diets and their sodium content should be stated on the label; the stated value should be employed in diet calculations.

‡ Variation is to be expected in the estimated sodium content of most foods listed. The sodium content of foods marked "†" is reported as especially variable, and the estimated values must be taken as approximations.

TABLE 44—Continued

Food	Sodium (Mg/100 Gm)	Food	Sodium (Mg/100 Gm)
"Ry-Krisp".....	1,500	Oils (corn, cottonseed, cod-liver, olive, peanut, etc.).....	Negligible
soda.....	1,100	Okra, raw.....	1
matzoth.....	Variable†	Olives, pickled.....	2,000†
matzoth, unsalted, plain.....	1	Onions.....	10†
Cranberries.....	1	Oranges.....	1
sauce, canned.....	1†	Orange juice, canned.....	1
Cream.....	40	Parsley, raw.....	30
Cucumber, raw.....	5†	Parsnips, raw.....	8
Currants, raw.....	2	Peaches, raw.....	1
dried.....	20	frozen.....	3
Dates.....	1	canned.....	2†
Duck.....	85†	Peanut butter, prepared without added sodium.....	5†
Eggs, whole.....	130	Pears, raw.....	2
whites only.....	150	canned.....	2†
yolks only.....	85	Peas, raw.....	2
Eggplant.....	2	frozen.....	Variable†
Figs, raw.....	2	canned without added sodium.....	2†
canned.....	2†	dried.....	20†
dried.....	34	Peppers, green, raw.....	1
Fish and Shellfish:		Pineapple, raw.....	1
bluefish, raw, unsalted.....	68	frozen.....	1
catfish, raw, unsalted.....	60	canned.....	1†
codfish, raw, unsalted.....	65	Pineapple juice, canned.....	1†
crab, boiled.....	370	Plums, raw.....	1
flounder, raw, unsalted.....	68	canned.....	1†
halibut, raw, unsalted.....	56	Pork, lean, raw.....	55
herring, raw, unsalted.....	100	Potatoes, white, raw.....	3
lobster, boiled.....	250†	Prunes, raw.....	1
oysters, raw.....	Variable	canned.....	3†
rockfish, raw, unsalted.....	45	dried.....	6
salmon, raw, unsalted.....	50	Prune juice.....	2
canned without added sodium.....	60†	Pumpkin, raw.....	1
canned.....	540†	Rabbit.....	40
sardines, canned.....	550†	Radish.....	15†
shrimp, raw.....	140	Raisins.....	25
tuna, canned.....	800†	Raspberries, raw.....	1
canned without added sodium.....	50†	canned.....	2†
Flour, bleached, enriched; whole wheat; rye; buckwheat, etc.....	2	Rhubarb, raw.....	2
Flour, self-rising.....	1,500†	frozen.....	2
Fruit cocktail, canned.....	5†	Rice, dry, polished.....	2
Gelatin, plain.....	30†	Sauerkraut, canned.....	650†
dessert, flavored.....	330†	Shortening ("Crisco," "Spry," lard, etc.).....	Negligible
flavored, without added sodium.....	10†	Sirup, corn ("Karo").....	68
Goose, raw.....	85†	maple.....	14
Grapes.....	2	sorghum.....	20†
Grapefruit.....	1	table blends.....	60†
canned.....	2†	Soybeans, dry.....	4
Grapefruit juice, canned.....	2†	Spaghetti, plain.....	5†
Ham, cured.....	1,100†	Spices and herbs (all spices with the exceptions of celery seed and flakes and parsley flakes may be used in sodium-restricted diets).	
Hominy, canned.....	250†	Spinach, raw.....	75†
Honey.....	7	canned without added sodium.....	50†
Ice cream.....	90	frozen.....	70†
Jam.....	12†	Squash, raw, all types.....	1
Jelly.....	12†	Starch, corn.....	4
Kale.....	80†	Strawberries, raw.....	1
Lamb, lean, raw.....	90	Strawberries, frozen sweetened.....	2
Lemons, pulp and juice.....	1	canned.....	1†
Lettuce, head.....	15†	Sugar, white.....	Negligible
Liver, beef, raw.....	130†	light brown.....	25†
chicken, raw.....	85	Sweet potato, raw.....	10†
goose, raw.....	140	Tangerines.....	1
pork, raw.....	80	Tapioca, dry.....	4
turkey, raw.....	50	Tea, blend, dry.....	4
Macaroni, plain.....	5†	Tomatoes, raw.....	3
Margarine, salted.....	1,100†	canned without added sodium.....	3†
unsalted.....	10†	Tomato juice, canned.....	230†
Mayonnaise, without added sodium.....	25†	canned without added sodium.....	5†
Milk, fresh, whole or skim.....	50	Turkey, raw.....	65†
evaporated, canned.....	100	Turnips, white.....	40†
skim, dried.....	525	yellow.....	5
malted, dry.....	440	Turnip greens.....	10
"Lesofac" (modified low-sodium milk powder).....	13	Veal, raw.....	100†
"Lonalac" (modified low-sodium milk powder).....	15	Vinegar.....	1
Molasses.....	40†	Watermelon.....	1
Mushrooms, raw.....	5	Yeast, baker's.....	3
canned without added sodium.....	3†	cultured, dry.....	Variable
Noodles, egg.....	10		
Nuts, all, unsalted (average).....	4		

TABLE 45*

SODIUM AND POTASSIUM CONTENT OF FOODS
(Analyses Made on Edible Portions of Unprocessed Foods
except as Otherwise Designated)

Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)	Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)
All-Bran cereal.....	1,400	1,200	<i>Bread:</i>		
Allspice.....	62	680	Boston brown, with raisins.	280	360
<i>Almond:</i>			low-sodium—4 laboratory		
raw.....	3	690	samples.....	3	94
roasted in oil, salted.....	160	710	low-sodium cinnamon roll—		
Anchovy paste.....	9,800	200	laboratory sample.....	2	120
<i>Apples:</i>			low-sodium—14 commercial		
juice (sweet cider), bottled.	4	100	"salt-free" breads:		
June, less skin and core...	0.1	71	maximum.....	76	200
Mackintosh, less skin and			minimum.....	4	72
core.....	0.2	90	average.....	28	120
Red Delicious, less skin and			Passover—see Matzoth		
core.....	0.3	76	rye and wheat.....	590	160
sauce, canned.....	0.3	55	white, enriched.....	640	180
<i>Apricot:</i>			whole wheat.....	930	230
canned in syrup.....	2	65	whole wheat and white...	620	250
dried.....	11	1,700	Breakfast cereals—see under		
raw, with skin.....	0.6	440	individual cereal		
Artichoke, globe.....	43	430	<i>Broccoli:</i>		
<i>Asparagus:</i>			fresh.....	16	400
spears, canned.....	410	130	frozen.....	13	250
tips, fresh.....	2	240	<i>Brussels sprouts:</i>		
tips, frozen.....	3	320	fresh.....	11	450
Avocado.....	3	340	frozen.....	9	300
<i>Bacon:</i>			<i>Butter:</i>		
fried crisp.....	2,400	390	theoretical sodium value		
raw.....	680	110	based on U.S. average salt		
<i>Baking powder:</i>			content of 2.5%.....	980	
alum type.....	10,000	150	4 Indiana samples.....	880	23
phosphate type.....	9,000	170	unsalted.....	5	4
tartrate type.....	7,300	5,000	Buttermilk, cultured.....	130	140
Banana.....	0.5	420	Cabbage.....	5	230
Barley, pearled.....	3	160	<i>Candy:</i>		
<i>Beans:</i>			bar, Baby Ruth.....	170	300
baked, Heinz, navy			bar, Milky Way.....	220	150
with pork and tomato			bar, Oh Henry.....	76	420
sauce, canned.....	480	210	gumdrop.....	41	18
with tomato sauce,			marshmallow.....	41	6
canned.....	400	140	milk chocolate.....	86	420
dry, navy.....	1	1,300	Necco wafers.....	5	2
green, in pods			peppermint patty, Schrafft's	10	110
canned.....	410	120	sweet chocolate.....	35	230
fresh.....	0.9	300	Cantaloupe.....	12	230
frozen.....	2	110	Caraway seed.....	17	1,400
Lima			Carbonated drinks—see under		
canned.....	310	210	individual drinks		
fresh.....	1	680	<i>Carrots:</i>		
frozen.....	310	580	canned.....	280	110
<i>Beef:</i>			scraped and trimmed.....	31	410
corned.....	1,300	60	<i>Casein:</i>		
dried.....	4,300	200	acid-washed.....	0.4	2
lean, koshered, raw.....	1,600	290	low-ash commercial.....	13	39
lean, raw.....	51	360	vitamin-free.....	160	900
Beer.....	8	46	<i>Cashew nuts:</i>		
<i>Beets:</i>			raw.....	14	560
canned.....	36	120	roasted in oil, salted.....	200	560
greens, fresh.....	130	570	Catchup, tomato.....	1,300	800
raw.....	110	350	Catfish (fiddler), Ohio River.	60	330
Blackberry.....	0.2	150	<i>Cauliflower:</i>		
Blueberry.....	0.6	89	buds.....	24	400
Bouillon cube.....	24,000	100	buds, frozen.....	22	290
Brain, pig.....	150	340	Caviar, salmon, canned.....	2,200	180
Bran, wheat, crude.....	15	980	<i>Celery:</i>		
Brandy.....	3	4	salt.....	28,000	380
<i>Brazil nuts:</i>			seed.....	140	1,400
raw.....	1	670	stalks, less leaves.....	110	300
roasted in oil, salted.....	190	730			

* Tables 45 and 46 were compiled by Charles E. Bills, Francis G. McDonald, William Niedermeier, and Melvin C. Schwartz and published in J. Am. Dietet. A., 25:304-14, 1949.

TABLE 45—Continued

Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)	Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)
<i>Cereals, dry:</i>			Cookie, salt-free, Betty Bake- rite.....	12	240
bran			<i>Corn:</i>		
All-Bran.....	1,400	1,200	flakes.....	660	160
crude, unsalted.....	15	980	meal, yellow, enriched, de- germinated.....	0.7	120
corn flakes.....	660	100	oil.....	0.2	0.1
farina			popcorn, popped and oiled.....	3	240
Cream of Wheat, plain..	2	86	popcorn, popped, oiled, and salted.....	2,000	240
Cream of Wheat, quick- cooking, enriched.....	90	84	starch.....	4	4
Grape-Nuts.....	660	230	sweet		
Pabena.....	640	340	white		
Pabum.....	620	380	canned.....	200	200
Rolled oats.....	2	340	milk stage.....	0.3	240
Ry-Krisp.....	1,500	600	yellow		
Wheat:			canned.....	210	200
flakes.....	1,300	320	frozen.....	9	190
germ, malt-flavored, Zing	9	780	milk stage.....	0.4	370
Instant Ralston.....	1	360	yellow field, dry—5 varieties	0.6	290
Maltex.....	4	250	Cowpeas, fresh, shelled.....	2	560
Muffets.....	4	300	Crab, canned.....	1,000	110
Pettijohn's.....	2	380	<i>Crackers:</i>		
Puffed.....	4	340	graham.....	710	330
Shredded.....	2	330	rye, Ry-Krisp.....	1,500	600
Wheatena.....	2	380	soda.....	1,100	120
Certo (pectin solution).....	15	110	unsalted, Jewish—see Matz- oth		
<i>Chard:</i>			<i>Cranberry:</i>		
large leaves.....	210	720	raw.....	1	65
small leaves.....	84	380	sauce, canned.....	1	17
<i>Cheese:</i>			Cream of tartar—theoretical value for pure $\text{KHC}_4\text{H}_4\text{O}_6$	0	20,776
American Swiss.....	710	100	Cream, whipping, 32% fat...	40	56
Cheddar.....	700	92	Crisco (vegetable shortening)	4	0
cottage.....	290	72	Cucumber, less parings.....	0.9	230
cream, Philadelphia.....	250	74	<i>Currants:</i>		
process.....	1,500	80	red.....	2	160
whey, Velveeta.....	1,600	270	Zante, dried (Zante raisins)	22	730
<i>Cherries:</i>			Curry powder.....	45	1,300
sour, frozen in syrup.....	2	78	Dandelion greens.....	76	430
sweet			Date, semi-dry, California...	1	790
dark			<i>Dextri-Maltose:</i>		
raw.....	1	260	No. 1.....	840	160
canned in syrup.....	0.8	77	No. 2.....	46	160
frozen in syrup.....	1	280	No. 3.....	46	1,300
light, canned in syrup...	3	55	B.....	52	360
Chestnut.....	2	410	Dextrin.....	14	14
<i>Chicken, raw:</i>			Dextrose.....	1	0.4
breast meat.....	78	320	Dill, seed.....	13	1,000
leg meat.....	110	250	<i>Duck, domesticated, raw:</i>		
<i>Chocolate—see also under indi- vidual candy</i>			breast meat.....	68	360
syrup, Hershey.....	60	130	leg meat.....	96	210
unsweetened.....	4	830	<i>Egg:</i>		
<i>Cider, sweet (apple juice), bottled.....</i>	4	100	whites only.....	110	100
<i>Cinnamon.....</i>	8	200	whole.....	81	100
<i>Citron, candied.....</i>	290	120	yolks only.....	26	100
<i>Clam.....</i>	180	240	Eggplant, less skin.....	0.9	190
<i>Clove.....</i>	210	1,000	Endive greens.....	18	400
<i>Coca-Cola.....</i>	1	52	<i>Farina:</i>		
<i>Cocoa:</i>			Cream of Wheat, plain, dry	2	86
Dutch process.....	57	3,200	Cream of Wheat, quick- cooking, enriched, dry...	90	84
plain, Hershey.....	5	1,400	<i>Figs:</i>		
<i>Coconut:</i>			canned in syrup.....	1	105
dry, shredded.....	16	770	dried.....	34	780
meat.....	29	320	raw.....	2	190
milk.....	53	190	Filberts (hazelnuts).....	1	560
<i>Cod:</i>			<i>Flour:</i>		
raw.....	60	360	bleached		
frozen fillets.....	400	400	enriched, Gold Medal...	1	86
liver oil.....	0.1	0	enriched, phosphated...	13	78
salted, dried.....	8,100	160	buckwheat.....	1	680
<i>Coffee:</i>			gluten.....	2	24
instant, Nescafé, dry.....	84	3,100	rye, dark.....	1	860
roasted					
decaffeinated, Sanka, dry	6	2,000			
regular, dry.....	2	1,600			

TABLE 45—Continued

Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)	Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)
<i>Flour—Continued</i>			<i>Liver, raw:</i>		
self-rising.....	1,500	90	calf.....	110	380
untreated, high-extraction..	1	120	goose.....	140	230
whole wheat (graham).....	2	290	pig.....	77	350
Fruit cocktail, canned in syr-			turkey.....	51	160
up.....	9	160	Lobster, boiled in tap water..	210	180
Garlic, less skin.....	6	510	Lonalac, dry.....	13	1,300
<i>Gelatin:</i>			Macaroni, plain, dry.....	1	160
dessert, flavored, Jell-O...	330	210	Mace.....	45	180
plain.....	36	22	Maize—see Corn		
Gin.....	0.7	0.3	Maltex cereal, dry.....	4	250
Ginger.....	29	1,100	Maple syrup.....	14	130
Ginger ale.....	8	0.6	Marmalade, orange.....	13	19
Gizzard, turkey.....	58	170	<i>Matzoth:</i>		
Gluten flour.....	2	24	American style (salted)....	470	120
<i>Goose, raw:</i>			egg.....	16	160
breast meat.....	76	420	farfel (dough balls).....	28	130
leg meat.....	96	420	meal.....	4	130
<i>Gooseberry:</i>			Passover (Passover bread)..	1	140
frozen.....	2	150	plain.....	1	160
raw.....	0.7	87	poppy seed.....	350	110
<i>Grapes:</i>			thin tea.....	2	130
Concord, less seeds and skin	3	84	whole wheat.....	280	420
Emperor, less seeds, with			Mayonnaise.....	590	25
skin.....	4	180	Meat extract, flavored.....	11,000	6,000
jam.....	7	78	<i>Milk:</i>		
juice, Concord, sweetened,			cow's		
bottled.....	1	120	buttermilk, cultured....	130	140
Thompson Seedless, with			condensed, sweetened...	140	340
skin.....	4	180	evaporated.....	100	270
Tokay, less seeds, with skin	0.7	160	fat.....	0.4	0.3
<i>Grapefruit:</i>			skim.....	52	150
fresh.....	0.5	200	whole		
juice, sweetened, canned...	0.4	150	dry.....	410	1,100
sections, sweetened, frozen..	5	60	liquid.....	50	140
Grape-Nuts cereal.....	660	230	goat's.....	34	180
Gravy flavoring, Kitchen Bou-			human		
quet.....	86	280	from 10 mothers, 3-10		
Gum, chewing, spearmint....	22	27	days postpartum.....	37	68
<i>Halibut:</i>			from 4 mothers, 49-77		
raw.....	56	540	days postpartum.....	11	51
steak, frozen.....	460	500	low-sodium—see Lonalac		
Ham, raw.....	1,100	340	malted, dry.....	440	720
Hash, corned beef, canned...	540	200	Molasses, cane.....	80	1,500
Hazelnuts—see Filberts			Muffets cereal.....	4	300
<i>Heart:</i>			Mulberry.....	0.7	200
beef.....	90	160	<i>Mushrooms:</i>		
turkey.....	69	240	canned.....	400	150
Hominy, canned.....	250	22	raw.....	5	520
Honey.....	7	10	<i>Mustard:</i>		
Horse-radish, prepared.....	96	290	greens.....	48	450
Ice cream.....	100	90	powder.....	3	840
Jam, grape.....	7	78	prepared paste.....	1,300	130
Kale, leaves and midribs....	110	410	Nectarine, less skin.....	2	320
Kidney, beef.....	210	310	Nutmeg.....	14	160
Kumquat, pulp and rind, less			Oats, rolled (oatmeal), dry...	2	340
seeds.....	7	230	Okra, fresh.....	1	220
Lactalbumin.....	47	69	Oleomargarine.....	1,100	58
Lactose, U.S.P.....	2	0	<i>Olives:</i>		
<i>Lamb:</i>			green, pickled.....	2,400	55
chop, lean, raw.....	98	340	oil.....	0.2	0.2
leg, lean, raw.....	78	380	ripe, pickled.....	980	23
Lard.....	0.3	0.2	stuffed, pickled.....	2,800	55
Lemon-lime soda.....	7	33	Onions, less tops and dry skins	1	130
<i>Lemons:</i>			Orange Crush.....	2	100
peel			<i>Oranges:</i>		
candied.....	50	12	juice, unsweetened, canned	0.5	190
fresh.....	9	360	pulp and juice.....	0.3	170
pulp and juice.....	0.7	130	Temple, pulp and juice....	3	220
Lentils, dry.....	3	1,200	Oyster, raw.....	73	110
<i>Lettuce:</i>			Pabena cereal, dry.....	640	340
head.....	12	140	Pablum cereal, dry.....	620	380
leaf.....	7	230	Pancreas, pig, raw.....	57	240
Lime, pulp and juice.....	1	100	Paprika.....	82	2,300
Litchi, dried.....	3	1,100	Parsley, fresh.....	28	880

TABLE 45—Continued

Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)	Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)
Parsnip, scraped and trimmed, fresh.....	7	740	<i>Pumpkin:</i> canned.....	2	240
<i>Peaches:</i> canned in syrup.....	5	31	raw, less rind and seeds... .	0.6	480
dried.....	12	1,100	<i>Quail, raw:</i> breast meat.....	35	160
frozen in syrup.....	3	120	leg meat.....	44	190
raw, less skin.....	0.5	160	Quince, less skin and core, raw	0.7	290
<i>Peanuts:</i> butter.....	120	820	<i>Rabbit, domesticated, raw:</i> foreleg.....	47	370
oil.....	0.2	0.1	loin.....	34	400
raw, with skin.....	2	720	Radish, with skin.....	9	260
roasted dry, with skin.....	2	740	<i>Raisin:</i> seedless.....	21	720
in oil and salted, with skin.....	460	700	Zante.....	22	730
<i>Pears:</i> Bartlett canned in syrup.....	8	52	Ralston cereal, Instant, dry..	1	360
raw, less skin and core..	2	100	<i>Raspberries:</i> black.....	0.3	190
<i>Peas:</i> canned, less liquor.....	270	96	oriental (wineberry).....	0.9	170
dry, split.....	42	880	red.....	0.5	130
fresh.....	1	370	Rennet tablets, Junket.....	38,000	36
frozen.....	100	160	<i>Rhubarb:</i> frozen in syrup.....	2	160
Pecan, raw.....	0.3	420	raw.....	1	70
Pectin solution, Certo.....	15	110	<i>Rice, dry:</i> brown.....	9	150
<i>Pepper (spice):</i> black.....	16	880	flakes.....	720	180
red.....	46	2,400	polished and coated.....	2	130
white.....	5	48	puffed.....	0.9	100
Peppermint extract.....	0.3	5	vitaminized.....	4	170
Peppers, green, empty pods..	0.6	170	wild (<i>Zizania</i>).....	7	220
Pepsi-Cola.....	15	3	Root beer.....	8	0.5
Persimmon, wild.....	0.6	310	Royal Crown Cola.....	5	2
Pettijohn's cereal, dry.....	2	380	Rum.....	2	3
Pickle, dill.....	1,400	200	Rutabaga (yellow turnip), less skin and tops, raw.....	5	260
Pilchard—see Sardine			Ry-Krisp.....	1,500	600
<i>Pineapple:</i> canned in syrup.....	1	120	Sage.....	20	670
frozen in syrup.....	1	38	<i>Salmon:</i> canned.....	540	300
juice, unsweetened, canned	0.5	140	raw.....	48	410
raw.....	0.3	210	Salt—theoretical value for pure NaCl.....	39,342	0
<i>Plums:</i> canned in syrup.....	18	110	<i>Sardines:</i> herring, canned in oil.....	510	0
raw.....	0.6	170	pilchard canned in natural sauce..	760	260
Polyvitamin dispersion, Mead's, dry.....	6	10	canned in tomato sauce..	400	320
Pomegranate, pulp and juice.	0.3	200	Sauerkraut, canned.....	630	140
<i>Popcorn:</i> popped oiled.....	3	240	<i>Sausage:</i> Bologna.....	1,300	230
oiled and salted.....	2,000	240	frankfurter.....	1,100	220
<i>Pork:</i> lean, raw.....	58	260	pork.....	740	140
salt.....	1,800	27	Scallop, frozen.....	150	420
<i>Postum:</i> cereal beverage, dry.....	36	1,300	<i>Shortening, vegetable:</i> Crisco.....	4	0
Instant, dry.....	71	2,200	Spry.....	0.4	0.2
<i>Potatoes:</i> chips.....	340	880	Shrimp, raw.....	140	220
sweet canned.....	48	200	Soda, baking—theoretical val- ue for pure NaHCO ₃	27,373	0
raw, less skin.....	4	530	<i>Soft drinks:</i> carbonated water Canada Dry.....	18	0.6
white canned.....	350	240	made with Sparklet car- bon dioxide capsule and distilled water.....	0	0
raw, less skin.....	0.8	410	White Rock.....	1	0.6
Poultry seasoning.....	26	840	Coca-Cola.....	1	52
Pretzel.....	1,700	130	ginger ale.....	8	0.6
Protenum, dry.....	360	1,100	lemon-lime soda.....	7	33
<i>Prunes:</i> canned in syrup.....	3	220	Orange Crush.....	2	100
dried.....	6	600	Pepsi-Cola.....	15	3
juice, unsweetened, bottled	2	260	Royal Crown Cola.....	5	2
raw, with skin.....	0.7	210	root beer.....	8	0.5
			Sorghum syrup.....	21	600

TABLE 45—Continued

Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)	Food	Sodium (Mg/100 Gm)	Potassium (Mg/100 Gm)
<i>Soup:</i>			Tripe, pickled.....	46	19
beef, canned, diluted as served.....	410	100	Tuna, canned.....	800	240
tomato, canned, diluted as served.....	380	110	<i>Turkey, raw:</i>		
vegetable, canned, diluted as served.....	380	120	breast meat.....	40	320
<i>Soybeans:</i>			leg meat.....	92	310
dry.....	4	1,900	Turmeric.....	22	2,700
flour, solvent-extracted....	1	1,700	<i>Turnips, raw:</i>		
Spaghetti—see Macaroni			leaves.....	10	440
<i>Spinach:</i>			white, less skin and tops...	37	230
canned.....	320	260	yellow (rutabaga), less skin and tops.....	5	260
frozen.....	60	380	Vanilla extract.....	1	74
raw.....	82	780	Veal, lean, raw.....	48	330
Spry (vegetable shortening)..	0.4	0.2	<i>Vinegar:</i>		
<i>Squash, raw:</i>			cider.....	1	100
acorn, less rind and seeds..	0.4	260	distilled.....	0.6	15
Hubbard, less rind and seeds	0.3	240	<i>Walnuts, raw:</i>		
white summer, less rind, with seeds.....	0.2	150	black.....	3	460
yellow summer, less rind, with seeds.....	0.6	200	English.....	2	450
Squash, cooked, frozen.....	6	120	Water, carbonated—see Soft drinks		
Starch, corn.....	4	4	Watermelon, pink part of fruit	0.3	110
<i>Strawberries:</i>			<i>Wheat:</i>		
frozen, sweetened.....	2	180	beeswing (outermost coats)	4	360
raw.....	0.8	180	bran, crude.....	15	980
<i>Sugar:</i>			flakes cereal.....	1,300	320
light brown.....	24	230	germ		
white.....	0.3	0.5	crude.....	2	780
Sweetbreads—see Pancreas; Thymus			malt-flavored, Zing.....	9	780
<i>Syrup:</i>			gluten.....	2	24
chocolate, Hershey.....	60	130	puffed.....	4	340
maple.....	14	130	scourings (dirt and frag- ments).....	8	470
sorghum.....	21	600	shredded.....	2	330
table, corn-and-cane, Karo			winter, scoured—4 samples	2	370
Crystal White.....	68	4	Wheatena cereal, dry.....	2	380
<i>Tangerines:</i>			<i>Whiskey:</i>		
juice, sweetened, canned...	0.6	170	blended.....	0.3	1
pulp and juice.....	2	110	bonded.....	0.1	0.6
Tapioca, dry.....	5	19	Wild rice (<i>Zizania</i>), dry....	7	220
Tea, India-Ceylon-Java blend, dry.....	4	1,800	<i>Wine:</i>		
Thyme.....	38	500	port.....	4	75
Thymus, beef, raw.....	96	360	sauterne.....	10	87
Tobacco, chewing, Spark Plug	1,600	1,800	Wineberry (oriental raspber- ry).....	0.9	170
<i>Tomatoes:</i>			Worcestershire sauce.....	2,100	480
canned.....	18	130	<i>Yeast:</i>		
catchup.....	1,300	800	compressed.....	4	360
juice, canned.....	230	230	decaffeinated brewers', dry...	150	1,700
raw, with skin.....	3	230	primary cultured, dry—19 samples		
Tongue, beef, raw.....	100	260	maximum.....	320	2,200
			minimum.....	9	1,700
			average.....	115	1,860
			Zwieback.....	250	150

TABLE 46
SODIUM AND POTASSIUM CONTENT OF PUBLIC WATER SUPPLIES

Place	Sodium (Mg/100 Cc)	Potassium (Mg/100 Cc)	Place	Sodium (Mg/100 Cc)	Potassium (Mg/100 Cc)
Aberdeen, S.D.....	20	2	Frankfort, Ky.....	0.3	0.1
Albany, N.Y.....	0.2	0.2	Galesburg, Ill.....	30	2
Albuquerque, N.M....	5	0.7	Galveston, Texas....	34	0.7
Allentown, Pa.....	0.4	0.3	Grand Forks, N.D....	6	0.4
Annapolis, Md.....	0.2	0.2	Hamilton, Ohio.....	3	0.2
Ann Arbor, Mich.....	2	0.5	Harrisburg, Pa.....	0.2	0.1
Atlanta, Ga.....	0.2	0.2	Hartford, Conn.....	0.2	0.1
Augusta, Me.....	0.2	0.2	Helena, Mont.....	0.3	0.2
Austin, Texas.....	3	0.5	Houston, Texas.....	16	0.6
Baltimore, Md.....	0.3	0.2	Huntington, W.Va....	3	0.2
Bangor, Me.....	0.2	0.1	Independence, Mo....	9	0.5
Baton Rouge, La....	9	0.2	Indianapolis, Ind....	1	0.3
Beloit, Wis.....	0.5	0.2	Iowa City, Iowa.....	0.5	0.3
Billings, Mont.....	1	0.2	Jackson, Mich.....	5	0.3
Biloxi, Miss.....	23	0.6	Jackson, Miss.....	0.4	0.2
Birmingham, Ala....	2	0.3	Jacksonville, Fla....	1	0.2
Bismarck, N.D.....	6	0.6	Jefferson City, Mo....	3	0.4
Boise, Idaho.....	2	0.3	Jersey City, N.J.....	0.3	0.2
Boston, Mass.....	0.3	0.2	Joplin, Mo.....	0.5	0.1
Brownsville, Texas...	6	0.3	Kalamazoo, Mich....	0.7	0.3
Brownwood, Texas...	2	0.4	Kansas City, Kan....	4	0.4
Buffalo, N.Y.....	0.7	0.3	Kansas City, Mo....	10	3
Burlington, Vt.....	0.2	0.1	Lancaster, Pa.....	0.4	0.1
Butte, Mont.....	0.6	0.4	Lansing, Mich.....	1	0.5
Camden, N.J.....	0.9	0.3	Lawrence, Kan.....	4	0.7
Carson City, Nev....	0.4	0.3	Lincoln, Neb.....	3	0.7
Charleston, S.C.....	1	0.3	Little Rock, Ark.....	0.1	0.1
Charleston, W.Va....	0.3	0.2	Los Angeles, Calif.		
Charlotte, N.C.....	0.3	0.1	Aqueduct source...	6	0.6
Charlottesville, Va....	0.2	0.1	Metropolitan source	17	0.5
Cheyenne, Wyo.....	0.3	0.2	River source.....	5	0.5
Chicago, Ill.....	0.3	0.1	Louisville, Ky.....	2	0.3
Cincinnati, Ohio.....	0.7	0.3	Madison, Wis.....	0.4	0.2
Cleveland, Ohio.....	1	0.3	Manchester, N.H....	0.2	0.1
Columbia, S.C.....	0.4	0.2	Marion, Ohio.....	17	0.7
Columbus, Ohio.....	5	0.6	Memphis, Tenn.....	2	0.3
Concord, N.H.....	0.2	0.1	Miami, Fla.....	2	0.3
Corpus Christi, Texas.	15	0.6	Middletown, Ohio....	0.8	0.1
Crandall, Texas.....	170*	0.5	Milwaukee, Wis.....	0.3	0.1
Dallas, Texas.....	3	0.5	Minneapolis, Minn...	0.5	0.3
Dayton, Ohio.....	0.7	0.2	Minot, N.D.....	25	0.6
Denver, Colo.....	3	0.2	Moberly, Mo.....	0.3	0.2
Des Moines, Iowa....	1	0.4	Montgomery, Ala....	0.8	0.1
Detroit, Mich.....	0.3	0.1	Montpelier, Vt.....	0.1	0.1
Dover, Del.....	2	0.5	Nashville, Tenn.....	0.3	0.2
Durham, N.C.....	0.4	0.2	Newark, N.J.....	0.2	0.1
El Paso, Texas.....	7	0.6	New Haven, Conn....	0.3	0.1
Emporia, Kan.....	1	0.3	New Orleans, La....	1	0.4
Eureka, Calif.....	0.7	0.6	New York, N.Y.....	0.3	0.2
Evansville, Ind.....	2	0.5	Oakland, Calif.....	0.3	0.1
Fargo, N.D.....	5	0.7	Oklahoma City, Okla..	10	0.8
Flint, Mich.....	2	0.2	Olympia, Wash.....	0.5	0.3

* An extreme example. This water is rarely drunk, but is used for cooking.

TABLE 46—Continued

Place	Sodium (Mg/100 Cc)	Potassium (Mg/100 Cc)	Place	Sodium (Mg/100 Cc)	Potassium (Mg/100 Cc)
Omaha, Neb.....	8	1	San Francisco, Calif...	1	0.3
Philadelphia, Pa.....	2	0.4	Santa Barbara, Calif..	10	0.3
Phoenix, Ariz.....	11	0.7	Seattle, Wash.....	0.2	0.1
Pierre, S.D.....	9	0.5	Sedalia, Mo.....	0.3	0.2
Pittsburgh, Pa.....	6	0.5	Shreveport, La.....	2	0.1
Portland, Me.....	0.2	0.1	Sioux Falls, S.D.....	1	0.4
Portland, Ore.....	0.1	0.1	Springfield, Ill.....	0.8	0.3
Providence, R.I.....	0.2	0.1	Springfield, Mo.....	0.4	0.2
Raleigh, N.C.....	0.4	0.1	Syracuse, N.Y.....	0.2	0.1
Reno, Nev.....	0.5	0.1	Tallahassee, Fla.....	0.3	0.1
Richmond, Va.....	0.7	0.2	Tampa, Fla.....	0.5	0.1
Rochester, Minn.....	0.7	0.2	Texarkana, Ark.....	3	0.2
Rochester, N.Y.....	0.3	0.2	Topeka, Kan.....	1	0.5
Rockford, Ill.....	0.7	0.2	Trenton, N.J.....	0.1	0.1
Sacramento, Calif....	0.3	0.2	Tucson, Ariz.....	3	0.3
Santa Fe, N.M.....	0.4	0.1	Tulsa, Okla.....	0.3	0.4
St. Joseph, Mo.....	9	0.6	Uniontown, Pa.....	0.2	0.1
St. Louis, Mo.....	5	0.5	Upper Darby, Pa.....	0.4	0.2
St. Paul, Minn.....	0.5	0.3	Washington, D.C.....	0.3	0.3
St. Petersburg, Fla....	0.5	0.1	Whittier, Calif.....	1	0.2
Salem, Ore.....	0.2	0.1	Wichita, Kan.....	5	0.5
Salt Lake City, Utah.	0.8	0.2	Wilkes-Barre, Pa.....	0.2	0.1
San Angelo, Texas...	5	0.9	Wilmington, Del.....	0.8	0.1
San Antonio, Texas..	1	0.1	Winona, Minn.....	5	0.4
San Diego, Calif.....	5	0.5			

APPENDIX 8

MINERAL ELEMENTS AND EXCESS OF ACIDITY OR ALKALINITY

TABLE 47

MINERAL ELEMENTS* AND EXCESS OF ACIDITY OR ALKALINITY†
PER 100 GM. OF FOODS, EDIBLE PORTION

Food	MINERALS					EXCESS‡	
	Magnesium (Gm.)	Potassium (Gm.)	Sodium (Gm.)	Chlorine (Gm.)	Sulphur (Gm.)	Acidity (Cc. of N Acid HCl)	Alkalinity (Cc. of N Alkali NaOH)
Almonds.....	0.275	0.756	0.024	0.037	0.164	2.2	12.0-18.3
<i>Apples:</i>							
fresh.....	0.006	0.116	0.015	0.004	0.004		0.8-3.7
dried.....	0.029	0.557	0.072	0.019	0.019		
<i>Apricots:</i>							
fresh.....	0.012	0.370	0.021	0.004	0.006		4.8-8.4
dried.....	0.062	1.924	0.109	0.021	0.031		31.3-41.9
Asparagus.....	0.015	0.200	0.008	0.047	0.051	1.0	0.8
Bananas.....	0.024	0.412	0.023	0.163	0.013		4.4-7.9
Barley, entire.....	0.126	0.495	0.070	0.139	0.153	6.0-17.5	
<i>Beans:</i>							
dried.....	0.165	1.284	0.189	0.007	0.224		18.0-23.9
Lima, fresh.....	0.067	0.606	0.089	0.009	0.068		14.0
dried.....	0.181	1.899	0.282	0.025	0.156		41.6
string or green.....	0.032	0.288	0.012	0.045	0.024		4.1-5.4
Beef.....	0.032	0.382	0.066	0.056	0.221	8.1-38.5	
Beets.....	0.027	0.235	0.053	0.040	0.017		8.9-11.4
Beet greens.....	0.097	0.390			0.035		
Brains.....	0.016	0.269	0.160	0.155	0.130	17.7-20.7	
Bread, white.....	0.034	0.110	0.517	0.602	0.083	1.5-7.1	
Broccoli.....	0.024	0.352	0.030	0.076	0.126		3.6-4.9
Brussels sprouts.....	0.015	0.375			0.098		0.8-4.3
Butter.....	0.002	0.019	§	§	0.009	0.4-4.3	
<i>Cabbage:</i>							
celery.....	0.016	0.217	0.038	0.034	0.074		1.4-8.2
Cantaloupe.....	0.016	0.243	0.048	0.048	0.016		7.5
Carrots.....	0.020	0.219	0.050	0.035	0.019		4.4-10.8
Cauliflower.....	0.023	0.292	0.048	0.038	0.074		1.4-5.3
Celery.....	0.025	0.320	0.101	0.225	0.021		2.5-11.1
Cheese, hard.....	0.031	0.116	0.900	0.972	0.214	0.3-11.8	3.6-5.1
Cherries.....	0.012	0.125	0.015	0.004	0.018		1.7-7.3
Chestnuts.....	0.048	0.415	0.037	0.010	0.049		7.4-11.3
Chicken.....	0.047	0.402	0.054	0.034	0.303	9.6-25.4	
Chocolate.....	0.082	0.400	0.019	0.009	0.114	8.1	7.9
Cocoa.....	0.192	0.534	0.060	0.050	0.197		0.7
Coconut, fresh.....	0.040	0.360	0.040	0.120	0.044		4.1-7.0
Collards.....	0.017						
<i>Corn:</i>							
field, mature.....	0.142	0.300	0.110	0.041	0.124		
sweet							
fresh.....	0.047	0.278			0.037	1.8	
mature.....	0.121	0.415	0.148	0.050	0.146	6.0	
Cowpeas, dried.....	0.265	1.305	0.036	0.019	0.250		
Crabs.....	0.117	0.271	0.366	0.570	0.255	39.5	
Cranberries.....	0.005	0.056	0.002	0.004	0.008		3.2||
Cream.....	0.006	0.112	0.031	0.067	0.033		0.4-3.2
Cucumbers.....	0.020	0.170	0.026	0.028	0.011		3.2-31.5

* W. H. Peterson, J. T. Skinner, and F. M. Strong, Elements of food biochemistry (New York: Prentice-Hall, Inc., 1944), pp. 262-65.

† M. A. Bridges and M. R. Mattice, Food and beverage analyses (Philadelphia: Lea & Febiger, 1942), pp. 200-214.

‡ The ranges indicated come from reports of several authors, in which variety and method of preparation influence the results in part. For individual studies and sources of data see Bridges and Mattice, *op. cit.*

§ Variable.

|| Partly acid *in vivo*.

TABLE 47—Continued

Food	MINERALS					EXCESS†	
	Magnesium (Gm.)	Potassium (Gm.)	Sodium (Gm.)	Chlorine (Gm.)	Sulphur (Gm.)	Acidity (Cc. of N Acid HCl)	Alkalinity (Cc. of N Alkali NaOH)
<i>Currants:</i>							
fresh	0.031	0.208	0.015	0.010	0.021	.....	0.7-8.8
dried	0.155	1.040	0.075	0.050	0.105	.....	5.8-21.8
Dates.....	0.065	0.580	0.040	0.253	0.048	.....	5.5-12.4
Eel.....	0.018	0.241	0.032	0.035	0.133	7.0-9.9	.....
Eggplant.....	0.015	0.260	0.026	0.063	0.020	.....	4.5
Eggs.....	0.009	0.149	0.111	0.100	0.233	11.1-24.5	.....
Egg white.....	0.011	0.149	0.175	0.131	0.211	4.8-8.3	.....
Egg yolk.....	0.013	0.110	0.078	0.067	0.214	25.3-51.8	.....
<i>Figs:</i>							
fresh	0.020	0.205	0.043	0.037	0.017	.....	.....
dried	0.068	0.709	0.151	0.126	0.060	.....	10.0-100.9
Fish (all kinds).....	0.024	0.375	0.064	0.137	0.199	8.5-20.1	.....
Flour, wheat, white...	0.021	0.137	0.053	0.079	0.155	7.4-9.6	.....
Frog.....	0.024	0.308	0.055	0.040	0.163	10.6-15.8	.....
Garlic.....	0.008	0.130	0.009	0.004	0.318	.....	.....
Goose.....	0.031	0.406	.....	.....	0.326	7.7-24.5	.....
Gooseberries.....	0.009	0.150	0.010	0.009	0.015	.....	2.1-7.6
Grapefruit.....	0.007	0.164	0.006	0.007	0.005	.....	6.4
Grapes.....	0.004	0.267	0.011	0.002	0.009	.....	2.7-7.2
Haddock.....	0.017	0.334	0.099	0.241	0.225	8.5-19.7	.....
Heart.....	0.035	0.329	0.102	0.204	0.151	27.6	.....
Honey.....	0.004	0.051	0.006	0.015	0.003	1.1	0.4-4.6
Horse-radish.....	0.028	0.550	0.094	0.013	0.234	.....	2.7-5.8
Kale.....	0.055	0.486	0.050	0.120	0.160	.....	4.0-17.0
Kidney.....	0.019	0.240	0.238	0.376	0.148	8.4-31.0	.....
Kohlrabi.....	0.052	0.370	0.050	0.050	0.039	.....	6.0
Lamb (<i>see</i> Mutton)							
Leeks.....	0.037	0.380	0.036	0.110	0.056	.....	5.5-11.3
Lemons.....	0.006	0.152	0.009	0.006	0.012	.....	5.5-9.9
Lentils, dried.....	0.082	0.662	0.754	0.062	0.123	5.2-17.8	0.4-2.0
Lettuce.....	0.015	0.256	0.028	0.085	0.014	.....	3.8-14.1
Liver.....	0.021	0.255	0.021	0.091	0.258	9.4-49.5	.....
Lobster.....	0.022	0.258	.....	.....	.....	38.4	.....
Macaroni, dry.....	0.038	0.054	0.010	0.077	0.119	3.8-9.6	.....
<i>Milk:</i>							
cow							
fresh.....	0.019	0.129	0.047	0.114	0.031	.....	1.8-4.2
evaporated.....	0.038	0.258	0.094	0.228	0.067	.....	4.6
powder.....	0.118	0.955	0.348	1.029	0.229	.....	21.6
goat .....	.....	.....	0.026	0.163	.....	.....	.....
human	0.005	0.055	.....	0.058	0.142	.....	.....
Mushrooms.....	0.012	0.280	0.013	0.026	0.025	.....	1.8-4.0
Mustard greens.....	0.016	0.330	0.020	0.090	0.142	.....	.....
Mutton.....	0.033	0.260	0.070	0.069	0.187	4.5-22.5	.....
Oatmeal (rolled oats)...	0.143	0.365	0.072	0.027	0.207	1.5-13.2	.....
Oats, entire.....	0.150	0.450	0.168	0.089	0.187	.....	.....
Onions.....	0.016	0.200	0.020	0.053	0.065	.....	0.2-8.4
Orange juice.....	0.014	0.200	0.006	0.008	0.005	.....	4.5
Oranges.....	0.011	0.177	0.014	0.006	0.011	.....	5.6-9.6
Parsnips.....	0.038	0.396	0.010	0.038	0.025	.....	6.6-11.9

TABLE 47—Continued

Food	MINERALS					EXCESS†	
	Magnesium (Gm.)	Potassium (Gm.)	Sodium (Gm.)	Chlorine (Gm.)	Sulphur (Gm.)	Acidity (Cc. of N Acid HCl)	Alkalinity (Cc. of N Alkali NaOH)
<i>Peaches:</i>							
fresh	0.015	0.174	0.012	0.006	0.005	.....	3.8-6.1
dried	0.087	1.009	0.070	0.035	0.029	.....	4.1-12.1
Peanuts	0.169	0.706	0.052	0.040	0.276	3.9-16.4	.....
Pears	0.005	0.110	0.010	0.004	0.010	.....	1.5-3.6
<i>Peas:</i>							
green	0.035	0.259	0.024	0.049	0.035	1.4-2.9	1.2-5.2
mature	0.121	0.943	0.072	0.034	0.178	0.5-3.4	1.2-10.3
<i>Peppers:</i>							
green	0.025	0.270	0.015	0.031	0.030	.....	.....
red	0.013	0.120	0.006	0.014	0.030	.....	.....
Persimmons	0.005	0.170	0.013	0.009	0.011	.....	.....
Pike	0.031	0.416	0.029	0.032	0.218	2.8-19.5	.....
Pineapple	0.014	0.230	0.008	0.038	0.003	.....	2.2-7.00
Plums	0.010	0.212	0.003	0.002	0.004	.....	4.8||
Pork	0.027	0.415	0.081	0.040	0.216	7.7-28.6	.....
Potatoes	0.027	0.498	0.030	0.048	0.033	.....	7.0-12.8
Prunes, dried	0.032	0.845	0.101	0.004	0.024	.....	7.8-20.3||
Pumpkins	0.021	0.198	0.011	0.025	0.016	.....	0.3-7.8
Rabbit	0.029	0.415	0.047	0.051	0.184	14.8-22.4	.....
Radishes	0.014	0.166	0.083	0.056	0.038	.....	2.9-7.2
Raisins	0.017	0.796	0.120	0.068	0.043	.....	23.7-27.0
Raspberries	0.018	0.141	0.007	0.010	0.012	.....	4.1-6.1
Rhubarb	0.015	0.392	0.010	0.070	0.008	.....	8.6-13.0
<i>Rice:</i>							
entire	0.141	0.334	0.068	0.066	0.121	.....	.....
polished	0.033	0.046	0.012	0.056	0.114	2.5-9.0	.....
Rutabagas	0.015	0.210	0.052	0.031	0.069	.....	8.5
Rye, entire	0.136	0.477	0.060	0.043	0.152	11.3	.....
Sardines, fresh	0.035	.....	.....	.....	.....	11.4-26.5	.....
<i>Shrimps:</i>							
dried .....	.....	.....	.....	.....	.....	.....	.....
salted	0.327	0.760	§	§	0.183	1.6	.....
Soybeans, mature	0.287	1.693	0.280	0.007	0.269	.....	.....
Spaghetti (<i>see</i> Macaroni)							
Spinach	0.048	0.416	0.093	0.118	0.027	.....	5.1-39.6
Squash	0.006	0.161	0.011	0.018	0.029	.....	2.8
Strawberries	0.019	0.205	.....	.....	0.013	.....	1.8-3.5
Sugar beets	0.041	0.440	0.130	0.180	0.021	.....	3.3-9.4
Sweet potatoes	0.035	0.381	0.031	0.022	0.014	.....	5.0-7.9
Tomatoes	0.016	0.277	0.013	0.048	0.017	.....	5.6-13.7
Turkey	0.028	0.367	0.130	0.123	0.234	10.4-19.5	.....
Turnip greens	0.079	0.300	0.260	0.390	0.051	.....	2.3
Turnips	0.019	0.193	0.104	0.054	0.048	.....	2.7-10.2
Veal	0.030	0.380	0.086	0.073	0.199	9.8-28.5	.....
Venison	0.029	0.336	0.070	0.041	0.211	23.8	.....
Walnuts	0.132	0.606	0.013	0.030	0.120	7.9-9.2	.....
Watercress	0.010	0.100	0.031	0.059	0.071	.....	.....
Watermelon	0.006	0.071	0.012	0.006	0.005	.....	1.8-2.7
<i>Wheat:</i>							
entire	0.163	0.409	0.106	0.088	0.175	9.7-12.0	.....
bran	0.420	1.252	0.007	0.042	0.245	.....	.....
Yams	0.015	0.290	0.015	0.037	0.013	.....	.....

APPENDIX 9

WEIGHT AND HEIGHT TABLES

TABLE 48

DESIRABLE WEIGHTS FOR MEN AND WOMEN, ACCORDING TO
HEIGHT AND FRAME, AGES 25 AND OVER*

HEIGHT (IN SHOES)		WEIGHT IN INDOOR CLOTHING		
		Small Frame	Medium Frame	Large Frame
MEN				
Feet	Inches	Pounds	Pounds	Pounds
5	2.....	112-120	118-129	126-141
5	3.....	115-123	121-133	129-144
5	4.....	118-126	124-136	132-148
5	5.....	121-129	127-139	135-152
5	6.....	124-133	130-143	138-156
5	7.....	128-137	134-147	142-161
5	8.....	132-141	138-152	147-166
5	9.....	136-145	142-156	151-170
5	10.....	140-150	146-160	155-174
5	11.....	144-154	150-165	159-179
6	0.....	148-158	154-170	164-184
6	1.....	152-162	158-175	168-189
6	2.....	156-167	162-180	173-194
6	3.....	160-171	167-185	178-199
6	4.....	164-175	172-190	182-204
WOMEN				
4	10.....	92- 98	96-107	104-119
4	11.....	94-101	98-110	106-122
5	0.....	96-104	101-113	109-125
5	1.....	99-107	104-116	112-128
5	2.....	102-110	107-119	115-131
5	3.....	105-113	110-122	118-134
5	4.....	108-116	113-126	121-138
5	5.....	111-119	116-130	125-142
5	6.....	114-123	120-135	129-146
5	7.....	118-127	124-139	133-150
5	8.....	122-131	128-143	137-154
5	9.....	126-135	132-147	141-158
5	10.....	130-140	136-151	145-163
5	11.....	134-144	140-155	149-168
6	0.....	138-148	144-159	153-173

* Derived from data of the 1959 Build and Blood Pressure Study, Society of Actuaries. Developed by the Metropolitan Life Insurance Company, Statistical Bureau.

TABLE 49*

AVERAGE WEIGHT FOR HEIGHT TABLES

FOR GIRLS FROM BIRTH TO SCHOOL AGE†

Height (In.)	AVERAGE WEIGHT IN POUNDS											
	1 Mo.	3 Mo.	6 Mo.	9 Mo.	12 Mo.	18 Mo.	24 Mo.	30 Mo.	36 Mo.	48 Mo.	60 Mo.	72 Mo.
20.....	8											
21.....	9	10										
22.....	10	11										
23.....	11	12	13									
24.....	12	13	14	14								
25.....	13	14	15	15								
26.....		15	16	17	17							
27.....		16	17	18	18							
28.....			19	19	19	19						
29.....			19	20	20	20						
30.....			21	21	21	21	21					
31.....				22	22	23	23	23				
32.....					23	24	24	24	25			
33.....						25	25	25	26			
34.....						26	26	26	27			
35.....						29	29	29	29	29		
36.....							30	30	30	30	31	
37.....							31	31	31	31	32	
38.....								33	33	33	33	
39.....								34	34	34	34	34
40.....									35	36	36	36
41.....										37	37	37
42.....										39	39	39
43.....										40	41	41
44.....											42	42
45.....												45
46.....												47
47.....												50
48.....												52

* Figures from Metropolitan Life Insurance Company.

† Prepared by Robert M. Woodbury, Ph.D., Children's Bureau, Federal Security Agency.

TABLE 49—Continued
FOR BOYS FROM BIRTH TO SCHOOL AGE†

Height (In.)	AVERAGE WEIGHT IN POUNDS											
	1 Mo.	3 Mo.	6 Mo.	9 Mo.	12 Mo.	18 Mo.	24 Mo.	30 Mo.	36 Mo.	48 Mo.	60 Mo.	72 Mo.
20.....	8											
21.....	9	10										
22.....	10	11										
23.....	11	12	13									
24.....	12	13	14									
25.....	13	14	15	16								
26.....		15	17	17	18							
27.....		16	18	18	19							
28.....			19	19	20	20						
29.....			20	21	21	21						
30.....			22	22	22	22	22					
31.....				23	23	23	23	24				
32.....				24	24	24	25	25				
33.....					26	26	26	26	26			
34.....						27	27	27	27			
35.....						29	29	29	29	29		
36.....							30	31	31	31		
37.....							32	32	32	32	32	
38.....								33	33	33	34	
39.....								35	35	35	35	
40.....									36	36	36	36
41.....										38	38	38
42.....										39	39	39
43.....										41	41	41
44.....											43	43
45.....											45	45
46.....												48
47.....												50
48.....												52
49.....												55

TABLE 49—Continued
FOR GIRLS FROM FIVE TO EIGHTEEN YEARS†

Height (In.)	AVERAGE WEIGHT IN POUNDS													
	5 Yr.	6 Yr.	7 Yr.	8 Yr.	9 Yr.	10 Yr.	11 Yr.	12 Yr.	13 Yr.	14 Yr.	15 Yr.	16 Yr.	17 Yr.	18 Yr.
38.....	33	33												
39.....	34	34												
40.....	36	36	36											
41.....	37	37	37											
42.....	39	39	39											
43.....	41	41	41	41										
44.....	42	42	42	42										
45.....	45	45	45	45	45									
46.....	47	47	47	48	48									
47.....	49	50	50	50	50	50								
48.....		52	52	52	52	53	53							
49.....		54	54	55	55	56	56							
50.....		56	56	57	58	59	61	62						
51.....			59	60	61	61	63	65						
52.....			63	64	64	64	65	67						
53.....			66	67	67	68	68	69	71					
54.....				69	70	70	71	71	73					
55.....				72	74	74	74	75	77	78				
56.....					76	78	78	79	81	83				
57.....					80	82	82	82	84	88	92			
58.....						84	86	86	88	93	96	101		
59.....						87	90	90	92	96	100	103	104	
60.....						91	95	95	97	101	105	108	109	111
61.....							99	100	101	105	108	112	113	116
62.....							104	105	106	109	113	115	117	118
63.....								110	110	112	116	117	119	120
64.....								114	115	117	119	120	122	123
65.....								118	120	121	122	123	125	126
66.....									124	124	125	128	129	130
67.....									128	130	131	133	133	135
68.....									131	133	135	136	138	138
69.....										135	137	138	140	142
70.....										136	138	140	142	144
71.....										138	140	142	144	145

† Prepared by Bird T. Baldwin, Ph.D., and Thomas D. Wood, M.D.

TABLE 49—*Continued*
FOR BOYS FROM FIVE TO NINETEEN YEARS†

Height (In.)	AVERAGE WEIGHT IN POUNDS														
	5 Yr.	6 Yr.	7 Yr.	8 Yr.	9 Yr.	10 Yr.	11 Yr.	12 Yr.	13 Yr.	14 Yr.	15 Yr.	16 Yr.	17 Yr.	18 Yr.	19 Yr.
38.....	34	34													
39.....	35	35													
40.....	36	36													
41.....	38	38	38												
42.....	39	39	39	39											
43.....	41	41	41	41											
44.....	44	44	44	44											
45.....	46	46	46	46	46										
46.....	47	48	48	48	48										
47.....	49	50	50	50	50	50									
48.....		52	53	53	53	53									
49.....		55	55	55	55	55	55								
50.....		57	58	58	58	58	58	58							
51.....			61	61	61	61	61	61							
52.....			63	64	64	64	64	64	64						
53.....			66	67	67	67	67	68	68						
54.....				70	70	70	70	71	71	72					
55.....				72	72	73	73	74	74	74					
56.....				75	76	77	77	77	78	78	80				
57.....					79	80	81	81	82	83	83				
58.....					83	84	84	85	85	86	87				
59.....						87	88	89	89	90	90	90			
60.....						91	92	92	93	94	95	96			
61.....							95	96	97	99	100	103	106		
62.....							100	101	102	103	104	107	111	116	
63.....							105	106	107	108	110	113	118	123	127
64.....								109	111	113	115	117	121	126	130
65.....								114	117	118	120	122	127	131	134
66.....									119	122	125	128	132	136	139
67.....									124	128	130	134	136	139	142
68.....										134	134	137	141	143	147
69.....										137	139	143	146	149	152
70.....										143	144	145	148	151	155
71.....										148	150	151	152	154	159
72.....											153	155	156	158	163
73.....											157	160	162	164	167
74.....											160	164	168	170	171

APPENDIX 10

ENERGY EXPENDITURE

Passmore and Durnin (1) have compiled more than five hundred values representing energy expenditures while carrying out personal necessities: sitting and walking at different speeds; during children's recreation; light indoor recreation of adults; domestic work; mental work; office work; during such "moderate" exercise as canoeing, horseback riding, cycling; during "heavy" exercise,

TABLE 50
DAILY ENERGY EXPENDITURE OF THE REFERENCE MAN AND WOMAN (2)
(Mean Annual Temperature 10° C.)

		Calories
Man, 65 Kg.		
A. 8 hr. <i>working activities</i> : mostly standing, over-all rate: 2.5 cal/min		1,200
B. 8 hr. <i>non-occupational activities</i>		
1 hr. washing, dressing, etc., at 3.0 cal/min.....	180	
1½ hr. walking at about 6 k.p.h. at 5.3 cal/min.....	480	
4 hr. sitting activities at 1.54 cal/min.....	370	
1½ hr. active recreation and/or domestic work at 5.2 cal/min	470	1,500
C. 8 hr. <i>rest in bed</i> at basal metabolic rate.....		500
Total.....		3,200
Woman, 55 Kg.		
A. 8 hr. <i>working activities</i> in the home or in industry, mostly stand- ing, over-all rate: 1.83 cal/min		880
B. 8 hr. <i>non-occupational activities</i>		
1 hr. washing, dressing, etc., at 2.5 cal/min.....	150	
1 hr. walking about 5 k.p.h. at 3.6 cal/min.....	220	
5 hr. sitting activities at 1.41 cal/min.....	420	
1 hr. active recreation and/or domestic work at 3.5 cal/min.	210	1,000
C. 8 hr. <i>rest in bed</i> at basal metabolic rate.....		420
Total		2,300

such as football, swimming, skiing, cross-country running, fishing; in various types of light and heavy industry, agriculture, lumber work, and the various activities of soldiers.

The unit used in expressing energy expenditure is in terms of the *total* energy expenditure in calories per minute rather than in *net* energy expenditure above basal calories. This unit has been

recommended by the Committee on Calorie Requirements of the Food and Agriculture Organization in 1957 (2). Table 51 presents an example of how the energy expenditure may be distributed during the day.

REFERENCES

1. PASSMORE, R., and DURNIN, J. V. G. A. Human energy expenditure, *Physiol. Rev.*, 34:801-40, 1955.
2. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. Calorie requirements. ("FAO Nutritional Studies," No. 15.) Rome, 1957.

GLOSSARY OF DIETETIC TERMS

REVISED, 1958

In 1931, members of The American Dietetic Association were actively working on the complexities of diets named after doctors, diseases, and many miscellaneous symptoms. The lack of consistent principles, nutritional inadequacies, and overlapping produced much confusion, controversy, and strain on the dietetic services. At that time, Grace Bulman, as chairman of a committee of the Diet Therapy Section, began collecting routine hospital diets used in sixty-five Class A hospitals in various parts of the country. With characteristic understatement, she reported: "These show a wide variation as to nomenclature and type of foods included" (1). Margery Ardrey, as chairman in the following year, carried on with some descriptions of diets (2).

By 1939 the situation had reached the place where members felt the need for further revisions in nomenclature and descriptions of therapeutic diets which, among other things, would reflect the principle propounded earlier by Dr. Ruth Wheeler—that such diets should be regarded as modifications of the normal diet. At this time, Sister Jeanne d'Arc was appointed chairman of a committee to develop a glossary of dietetic terms. After two years of serious effort, a mimeographed list of terms was compiled and submitted to over two hundred members of the Association for review (3, 4). In the end, much order had been brought about by naming and describing diets in terms of dietetic principles rather

than after doctors and diseases. Official use was made of this "Glossary of Dietetic Terms" in the first edition of the *Handbook of Diet Therapy* compiled for The American Dietetic Association in 1946 (5). Diets were named, defined, and described as set forth in this Glossary.

By 1948 rapid strides in diet therapy brought members to the realization that corrections of inaccuracies, deletions, and additions were in order. Dr. Hazel Hauck as chairman and Dr. Helen Pilcher and Beatrice Finkelstein took the matter in hand, making extensive changes to bring the Glossary more closely in line with the newer findings in nutrition and the wishes of the members. At this time the committee stated:

In general the terms selected for inclusion in the Glossary of Dietetic Terms fall into the following categories: terms relating to the field of dietetics or the work of the dietitian; therapeutic diets; nutrients, or classes of nutrients required by man or thought to be useful in the human dietary; terms used in describing diets or foods, or relating to food composition; diseases associated with dietary deficiency or conditioned malnutrition; and some terms relating to digestion. The reader should consult a medical dictionary and appropriate texts for terms which are outside the scope of this glossary.

This revision was completed in 1950 and was used in naming and describing diets in the revised edition of the *Handbook of Diet Therapy* in 1952 (6). The complete Glossary appeared in this edition.

In 1956, members were again ready to reconsider the content of the Glossary. Under the chairmanship of Lorraine Weng, a committee of the Diet Therapy Section solicited recommendations from the state diet therapy sections regarding revisions in the *Handbook*. In response to a question, "Do you use the Glossary of Dietetic Terms in naming and defining diets in your hospital manual?" approximately 70 per cent replied that they used it in some degree; 30 per cent that they did not.

Since the purpose of the Glossary is to provide aid in the naming and description of diets as well as in the use of other related terminology in diet manuals, recommendations from this committee have been included in the Glossary. In addition, recent findings relating to the chemical structure and function of certain nutrients have been incorporated from the National Academy of Science-National Research Council Publication No. 589 (1958). However, the guide lines established in 1950 have been retained.

REFERENCES

1. WALLER, D. S. Report of Diet Therapy Section chairman, *J. Am. Dietet. A.*, 7:292, 1931.
2. Digest of committee reports, Diet Therapy Section. *In American Dietetic Association Reports for 1931-32*, *J. Am. Dietet. A.*, Suppl. 8, p. 21, 1933.
3. Committee reports, Diet Therapy Section. *In Annual Reports, 1939-40*, and *Proceedings New York meeting*, *J. Am. Dietet. A.*, 16:1015, 1940.
4. Committee report, Diet Therapy Section. *In Annual Reports, 1940-41*, and *Proceedings St. Louis meeting*, *J. Am. Dietet. A.*, 17:999, 1941.
5. Glossary of dietetic terms. *In TURNER, D. Handbook of diet therapy*. Chicago: University of Chicago Press, 1946.
6. Revised glossary of dietetic terms. *In TURNER, D. Handbook of diet therapy*. 2d ed. Chicago: University of Chicago Press, 1952.

GLOSSARY OF DIETETIC TERMS, REVISED, 1958

ACID, ARACHIDONIC—*See* Acids, fatty essential.

ACID, ASCORBIC ($C_6H_8O_6$)—A water-soluble vitamin unstable to oxidation; a white crystalline solid with a sour taste; the reduced form in which vitamin C is most commonly found in fresh food: concerned specifically with the maintenance of intercellular substances, including the collagen of fibrous tissue structures, the matrices of bones, cartilage, and dentine, and all non-epithelial cement substance, including that of the vascular endothelium. A deficiency lowers the activity of many cellular and serum enzymes well in advance of gross evidences of scurvy. Ascorbic acid also spares several members of the vitamin B complex.

ACID, DEHYDROASCORBIC ($C_6H_6O_6$)—First (reversible) oxidation product obtained from ascorbic acid; found in significant quantities in food which has undergone storage or processing; approximately as active, physiologically, as ascorbic acid.

ACID, FOLIC—*See* Folacin.

ACID, LINOLEIC—*See* Acids, fatty essential.

ACID, LINOLENIC—*See* Acids, fatty essential.

ACID, NICOTINIC—*See* Niacin.

ACID, PANTOTHENIC ($C_8H_{16}O_3NCOOH$)—A vitamin of the B complex; a constituent of coenzyme A, which is involved in the release of energy from carbohydrate utilization and is necessary for the synthesis and degradation of fatty acids, sterols, and steroid hormones; functions in the acetylation of choline, sulfonamide drugs, and para-aminobenzoic acid and is involved in the formation of porphyrins as well as many other compounds of great importance to the body. Thought to be a dietary essential for man, although proof is not clear-cut. A 2,500-calorie mixed diet provides about 10 mg. of pantothenic acid. The pantothenic acid content of foods may be found in *Agriculture Handbook No. 97, Pantothenic Acid in Foods* (U.S. Department of Agriculture, 1956), by E. G. Zook, M. J. MacArthur, and E. W. Toepfer, Human Nutrition Research Branch, Agricultural Research Service.

ACID, PARA-AMINOBENZOIC ($NH_2C_6H_4COOH$)—A vitamin of the B complex; part of the folic acid molecule and used by some organisms in the synthesis

of folic acid; usefulness of the compound as such, in the diet of man, not established.

ACID ASH RESIDUE—The inorganic radicals consisting chiefly of chloride, sulfate, and phosphate, which form acid ions (anions) in the body, measured as the amount of tenth-normal alkali required for neutralization.

ACID-FORMING FOODS—Foods in which the acid ash residue exceeds the alkaline ash residue. These include meat, fish, poultry, eggs, cereals, and some nuts. Certain fruits, such as cranberries, and some varieties of prunes and plums, although they have a predominantly alkaline residue, are acid-forming because the organic acids in them are not metabolized in the body. Pure starches, sugars, and fats, which produce carbonic acid during metabolism, are not included as "acid-forming" since carbonic acid is readily excreted by the lungs, without affecting alkaline reserve. *See* Acid ash residue.

ACIDOSIS—A condition caused by the abnormal accumulation of acids in, or the excessive loss of base from, the body; usually accompanied by a lowered alkaline reserve; for example, diabetic acidosis in which the acids concerned are beta-hydroxybutyric and acetoacetic acids, from incomplete oxidation of fat.

ACIDS, AMINO—*See* Acids, amino essential; Protein.

ACIDS, AMINO, ESSENTIAL—Some twenty-three amino acids are known to be physiologically important. Of these, eight have been demonstrated to be dietary essentials for the adult human, since they are synthesized in inadequate quantity by the body. This group of *essential* amino acids includes isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine. Dietary sources of a ninth amino acid, histidine, are probably necessary to maintain growth during childhood. The diet must include adequate sources of the essential amino acids and sufficient other "non-essential" amino acids for maintenance in the adult and growth in children. Requirements for reproduction, lactation, or other special body functions and in disease cannot be stated at present.

ACIDS, FATTY, ESSENTIAL—A group of unsaturated fatty acids, including arachidonic ($C_{19}H_{31}COOH$), linoleic ($C_{17}H_{31}COOH$), and linolenic ($C_{17}H_{29}COOH$); effective for relieving the deficiency condition in rats produced by a fat-free diet. Thought to be essential for humans.

ALCOHOL—About 70 per cent of the potential energy of alcohol is available to the body, i.e., about 5 calories per gram.

ALKALINE ASH RESIDUE—The elements sodium, potassium, calcium, and magnesium, which form basic ions (cations) in the body; measured as the amount of tenth-normal acid required for neutralization.

ALKALINE-FORMING FOODS—Foods in which the alkaline ash residue exceeds the acid ash residue. These include most fruits, vegetables, and milk. *See* Alkaline ash residue.

ALLERGEN—Any substance capable of inducing a condition of allergy or specific hypersensitiveness.

ALLERGY, FOOD—Hypersensitiveness to a substance (probably protein) in food which is ordinarily harmless in similar amounts for the majority of persons.

ANEMIA—A condition in which the hemoglobin content of the blood is low; red cells may be decreased in number or altered in appearance. Nutritional

anemias may be associated with various dietary deficiencies—for example, deficiencies of iron, protein, ascorbic acid, or folic acid; or they may be conditioned deficiencies, as is the case when hypochlorhydria results in decreased absorption of iron.

ANOREXIA—Lack or loss of appetite for food.

ANTI-PERNICIOUS ANEMIA FACTOR—*See* Extrinsic factor (Castle's); Vitamin B₁₂.

ANTIVITAMIN—Any substance that interferes with the synthesis or metabolism of a vitamin—for example, avidin, which combines with biotin and prevents its absorption; thiaminase in certain raw fish, which destroys thiamine; and sulfanilamide, which interferes with the synthesis of folic acid in the intestinal tract by competing with para-aminobenzoic acid for a place in the molecule.

APPETITE—A natural desire for food.

ARIBOFLAVINOSIS—The deficiency disease resulting from lack of riboflavin; frequently associated with deficiencies of other members of the B complex, as in beriberi and pellagra.

AS PURCHASED (A.P.)—Refers to food as offered for sale on the retail market. In tables which give nutritive value for food "as purchased," the nutrient content is stated in terms of the weight of the food before inedible portions or portions usually discarded are removed; i.e., the nutritive value of "refuse" is not included. *See* Edible portion.

ASH—The total mineral matter residue after ignition of a food; always either neutral or alkaline, since acid in excess of that which can be neutralized is volatilized.

AVITAMINOSIS—A disease due to the dietary deficiency of a vitamin or vitamins or to failure of absorption or utilization—for example, scurvy.

BASE-FORMING FOODS—*See* Alkaline-forming foods.

BERIBERI—A deficiency disease due to a lack of thiamine; endemic in areas in which polished rice is the chief item of the diet.

β-CAROTENE—*See* Carotene.

BIOTIN (C₁₀H₁₆O₃N₂S)—A member of the vitamin B complex; essential for the activity of many enzyme systems in bacteria, animals, and presumably man. Through carbon dioxide fixation reactions, it may be involved in the formation of acetoacetate and in the synthesis of fatty acids, such as oleic, which reduce biotin requirements. Widely distributed in foods, and intestinal bacteria synthesize it. Deficiency states have been recognized in man only when diets have included large amounts of avidin (a glycoprotein in raw egg white). An average American diet contains 150–300 μg. of biotin a day, an amount sufficient to maintain the individual in good health.

BULK—*See* Carbohydrate, indigestible, which is the preferred term.

CALCIFEROL (C₂₈H₄₄O)—Vitamin D₂; a fat-soluble vitamin; one of several anti-rachitic factors; irradiated ergosterol. *See* Ergosterol; Vitamin D.

CALORIE (LARGE OR KILO-CALORIE)—The unit used to express food energy; the amount of heat required to raise the temperature of 1 kg. of water 1° C.

CARBOHYDRATE, AVAILABLE—This term represents the portion of the carbohydrate of foods available to the human body for glycogen formation. It includes starch, dextrin, glycogen, glucose, fructose, galactose, sucrose, lactose, and maltose.

CARBOHYDRATE, INDIGESTIBLE—Substances which make up the cell-wall struc-

ture of plants, consisting of varying amounts of cellulose, hemicellulose, lignin, pectin substances, gums, mucin, etc.; not hydrolyzed by enzymes of the human gastrointestinal tract.

CARBOHYDRATE, TOTAL, BY DIFFERENCE—Solids in foods other than protein, fat, and ash; includes both available and indigestible carbohydrates and some organic acids.

CAROTENE ($C_{40}H_{56}$)—Provitamin A. A yellow-red plant pigment occurring in several forms; β -carotene is the most abundant form in common green leafy and yellow vegetables.

CELLULOSE ($C_6H_{10}O_5$)_n—A polysaccharide made up of beta-glucose units; constituent of the cell walls of plants. *See* Carbohydrate, indigestible; Fiber, crude.

CHOLESTEROL ($C_{27}H_{45}OH$)—A fatlike substance found in animal tissues (see Tables 39, 40, 41, 42); may be synthesized in the body; excreted in bile but largely reabsorbed from the digestive tract in the presence of fat. A constituent of gallstones and atheroma of the arteries.

CHOLINE ($C_5H_{15}O_2N$)—A component of lecithin and acetylcholine; often considered a member of the vitamin B complex; necessary for fat transport in the body; acts as a donor of labile methyl groups.

DIET—Daily allowance or intake of food and drink.

DIET, ACID-FORMING—A diet* in which the total acid ash exceeds the total basic ash. *See* Acid ash residue.

DIET, ALKALI-FORMING—A diet* in which the total basic ash exceeds the total acid ash. *See* Alkaline ash residue.

DIET, BLAND—A diet* composed of mild-flavored food. (See p. 37 in text.)

DIET, CALORIC, HIGH—A diet* which has a prescribed caloric value above the total energy requirement.

DIET, CALORIC, LOW—A diet* which has a prescribed caloric value below the total energy requirement.

DIET, CHOLESTEROL, LOW—A diet* in which the intake of total cholesterol is restricted. The dietary prescription should include the maximum permissible amounts of fat and cholesterol. (See p. 57 in text.)

DIET, ELIMINATION—An allowance of foods which do not commonly produce sensitivity in human patients. Used for the diagnosis of food allergy.

DIET, FAT MODIFICATIONS—A diet prescribed to meet a specified level of fat in the diet, a percentage of fat calories, or specified amounts or ratios of fatty acids.

DIET, FIBER, HIGH—A normal diet,* including an additional 2-3 servings of foods high in indigestible carbohydrate and an unrestricted amount of connective tissue.

DIET, FIBER, LOW—A diet* which contains a minimum of indigestible carbohydrates and no tough connective tissue.

DIET, FULL HOSPITAL—A normal diet* for patients who do not require dietary modifications for therapeutic purposes; also known as House, Regular, or General diet.

* This diet may be planned so as to meet the Recommended Dietary Allowances of the Food and Nutrition Board, National Research Council (1958), for healthy persons.

- DIET, GENERAL—See Diet, full hospital.
- DIET, GLIADIN-RESTRICTED—A diet without wheat, rye, oats, and barley. (See p. 68 in text.)
- DIET, "GLUTEN-FREE"—See Gliadin-restricted diet (p. 68 in text).
- DIET, HOUSE—See Diet, full hospital.
- DIET, KETOGENIC—A diet in which the ratio of fatty acid (ketogenic) value to glucose (antiketogenic) value equals 2 or more, i.e., sufficiently high to produce ketosis. It provides small amounts of carbohydrate, approximately 1 gm. protein per kilogram of body weight, and sufficient fat to meet full caloric requirements.
- DIET, LIQUID, CLEAR—This diet is most often used pre- and postoperatively. It supplies fluids but is of little importance nutritionally. Only fat-free broth, tea, and coffee with sugar but without milk or cream are allowed. Occasionally small amounts of ginger ale, clear fruit or vegetable juice, and gelatin may be added.
- DIET, LIQUID, FULL—A diet* consisting of a variety of foods that are liquid or liquefy at body temperature.
- DIET, PROTEIN MODIFICATIONS—A diet prescribed to provide a specified level of protein, or protein fraction, or a specified ratio or amount of amino acids.
- DIET, PURINE, LOW—A diet* in which sources of purines, such as glandular organs, dried legumes, and meat extractives are eliminated. Other meat and fish may be restricted to 4 oz. weekly, thus reducing the daily intake of uric acid equivalent to approximately 35 mg.
- DIET, REGULAR—See Diet, full hospital.
- DIET, SALT, LOW—See Diet, sodium-restricted.
- DIET, SODIUM-RESTRICTED—A diet in which the sodium content is limited to a prescribed level. (See p. 89 in text.)
- DIET, SOFT—A diet* modified in consistency, i.e., including liquid foods and those solid foods which contain a restricted amount of indigestible carbohydrate and connective tissue. (See p. 36 in text.)
- DIET, TEST—A meal or meals used for diagnostic purposes. See *Annual Reports and Proceedings, American Dietetic Association*, (1945-46), p. 35.
- DIET, THERAPEUTIC—A diet based on the normal diet and designed to meet the requirements of a given situation. It may be modified in individual nutritive constituents, caloric value, consistency, flavor, technics of service and preparation, content of specific foods, or a combination of these factors.
- DIETARY ALLOWANCES, RECOMMENDED (R.D.A.)—The amounts of various nutrients recommended by the Food and Nutrition Board of the National Research Council, as normally desirable objectives toward which to aim in planning practical dietaries in the United States; enough higher than the minimal requirements of average individuals to cover substantially all individual variations in the requirements of persons in normal health. Allowances are based on average body size and are stated for men and women at moderate physical activity; for pregnancy and lactation; and for children and adolescent boys and girls of various age groups. See text of the *Recommended Dietary Allowances, Revised, 1958* (NAS-NRC Pub. No. 589), for needs of nutrients for which allowances have not been proposed.

DIETARY CONSULTANT† (profess. & kin.)—Consultant dietitian. Advises and gives assistance to public and private establishments concerned with group feeding, such as child-care centers, hospitals, nursing homes, and schools on a variety of problems relating to management of food service units and application of science of nutrition: assists in planning, organizing, and conducting educational activities, such as in-service training courses, conferences, and institutes for food service managers, food handlers, and persons other than dietetic workers. Develops and evaluates informational material. Studies food service practices and facilities and makes recommendations for improvement. Works with architects and equipment personnel in planning for the building or remodeling of food service units. May be designated as **INSTITUTIONAL NUTRITION CONSULTANT** when employed by a public health department as consultant on nutrition programs for institutions.

DIETARY STANDARD FOR CANADA (CANADIAN COUNCIL ON NUTRITION)—The amounts of various nutrients considered to be necessary for normal persons; designed to indicate a “nutritional floor” beneath which the maintenance of health in people cannot be assumed; based on body size, age, sex, kind and extent of activity, with no extra allowance for margins of safety (L. B. Pett, Limitations in the use of dietary standards: differences in American, British and Canadian standards, *J. Am. Dietet. A.*, **27**:28–31, 1951).

DIETARY STANDARDS, BRITISH (COMMITTEE ON NUTRITION, BRITISH MEDICAL ASSOCIATION)—The amounts of various nutrients “believed to be sufficient to establish and maintain a good nutritional state in representative individuals of the groups concerned.” These standards refer to the average requirements and are presented with the understanding that “in every group there must be cases where the need for one or other nutrient is greater than that of the average” (L. B. Pett, Limitations in the use of dietary standards: differences in American, British and Canadian Standards, *J. Am. Dietet. A.*, **27**:28–31, 1951).

DIETETIC INTERN† (profess. & kin.) 0-39.931—Performs duties of a dietitian and follows a planned educational program while serving in an approved hospital or other institutions offering food service under designated management for a specified length of time following graduation from an accredited university or college; to gain practical experience as a requirement for many dietary occupations.

DIETETICS—The combined science and art of feeding individuals or groups under different economic or health conditions according to the principles of nutrition and management.

DIETITIAN—One who has a degree and advanced education or qualifying experience in the sciences of nutrition and management.

DIETITIAN† (profess. & kin.) 0-39.93—Applies principles of nutrition to feeding of individuals and groups; plans menus and special diets to provide food energy and nutrients. Supervises preparation and serving of meals. Maintains food cost controls. Instructs individuals and groups in the principles

† Reference to these definitions is as follows: Occupational Analysis Branch, U.S. Employment Service, *Dictionary of Occupational Titles, Second Edition, Suppl. 1* (Washington: U.S. Department of Labor, Bureau of Employment Security, Division of Placement Methods, March, 1955).

of nutrition as applied to the selection of food and prepares educational materials on nutritional value of foods and methods of preparation. Purchases food, equipment, and supplies; inspects work areas and storage facilities for sanitary conditions.

DIETITIAN, ADMINISTRATIVE† (profess. & kin.)—Executive dietitian. Administers and directs food service program in hospital, school, restaurant, club, or other public or private institution. Organizes program and establishes procedures in conformance with administrative policies. Selects and trains personnel. Plans menus and supervises preparation and serving of meals. Co-ordinates dietary service with activities of other departments. Determines that sanitary and safety standards are maintained. Purchases food, equipment, and supplies. Supervises maintenance of records and reports.

DIETITIAN, TEACHING† (profess. & kin.)—Nutritionist. Instructs classes in dietetics, nutrition, and institution management or directs educational program for dietetic interns, student nurses, and medical personnel. Prepares manual and course outline; lectures to students on composition and value of foods, principles of nutrition, menu planning, diet therapy, sanitation, food cost control, marketing, and administration of dietary department. Assigns dietetic interns to specific cases for study or diet formulation and evaluates results. Provides dietary instruction to individual patients in hospital or public health center. May engage in research.

DIETITIAN, THERAPEUTIC† (profess. & kin.)—Supervises preparation and serving of special diets in accordance with prescription of a physician. Formulates menus for therapeutic diets to provide indicated proportions of nutritional elements and in accordance with patient's food habits and preference. Instructs kitchen personnel in type and quantity of food to be prepared and method to be employed. Inspects meals for conformance to prescribed diet and standards of palatability and appearance. Participates in training of interns and instructs patients in diet therapy and foods and nutrition. May engage in research related to therapeutic diets.

DIGESTIBILITY, COEFFICIENT OF—The percentages of the carbohydrate, protein, and fat content of a food, which become available to the body for absorption.

DIGESTION—The process of converting food into substances which can be absorbed by the body.

EDIBLE PORTION (E.P.)—As used in food value tables, this term refers to that part of a food which is most commonly eaten. Some parts, such as parings of potatoes, which are edible but not usually eaten, are excluded.

ENERGY, FOOD—Expressed in calories per unit of weight. The Atwater system of caloric values has been in common use in the United States for many years. According to this system, the general caloric factors 4, 9, and 4 are applied to food composition in grams of protein, fat, and carbohydrate, respectively. These general factors allow for average losses in digestion and for incomplete oxidation of protein in the body; they are applicable to diets similar to the average American diet but are inaccurate when applied to diets of widely different composition or to individual foods. For this reason, the Committee on Calorie Conversion Factors and Food Composition, of the Nutrition Division of the Food and Agriculture Organization, prepared a list of values, derived from Atwater's original data and more recent investigations, which are applicable to the individual foods specified and,

with relatively small errors, to all foods within certain groups. The revised procedure advocated by the Committee on Calorie Conversion Factors and Food Composition was used in the preparation of U.S. Department of Agriculture Handbook No. 8, *Composition of Foods—Raw, Processed, Prepared* (June, 1950).

ENRICHED BREAD—May be made from enriched flour or by the addition of the required substances to the baker's formula or by the use of special high-vitamin yeast and iron. *See* Enriched flour.

ENRICHED FLOUR—White flour enhanced in thiamine, riboflavin, niacin, and iron value by changing the milling process to retain these constituents or by addition of the chemicals to white flour. The minimum levels specified in the standards of identity promulgated under the Food, Drug and Cosmetic Act are: thiamine, 2.0 mg.; riboflavin, 1.2 mg.; niacin, 16 mg.; and iron, 13 mg. per pound. Certain levels of vitamin D and calcium are permitted as optional ingredients. States which require enrichment of white flour have generally been guided by the federal legislation.

ERGOSTEROL ($C_{28}H_{44}O$)—A plant sterol found chiefly in yeast, which, upon being irradiated, forms calciferol (vitamin D_2).

EXTRINSIC FACTOR (CASTLE'S)—The factor supplied by food which, when present with the intrinsic factor, produces hemopoietic effects; vitamin B_{12} .

FAT—A glyceryl ester of fatty acids, which on hydrolysis yields three molecules of fatty acid and one of glycerol. In food tables, figures for fat include, in addition to true fats, other ether-extractable substances.

FIBER—As used in reference to therapeutic diets, this term includes indigestible organic tissue, either plant or animal.

FIBER, CRUDE—Made up largely of cellulose, those hemicelluloses which are not readily soluble, and lignin; as usually determined, that portion of a food sample which resists solution when boiled in dilute acid and dilute alkali.

FOLACIN—Generic term for a group of vitamins belonging to the B complex, including pteroylglutamic acid ($C_{19}H_{19}N_7O_6$) and its conjugates. Effective in the treatment of sprue and nutritional macrocytic anemia; promotes blood regeneration but does not prevent neurological complications in pernicious anemia. Folinic acid (citrovorum factor) is an important metabolite of folacin and may be the form active in cellular metabolism. Ascorbic acid is essential for normal conversion of folacin to folinic acid. Abundant in green leafy vegetables, liver, kidney, and yeast. A dietary intake of less than 1 mg. daily will probably cover nutritional needs for folacin activity. For folic acid content of foods, see Agriculture Handbook No. 29, *Folic Acid Content of Foods* (Washington: U.S. Department of Agriculture, 1951), by E.W. Toepfer, E. G. Zook, M. L. Orr, and L. R. Richardson, Bureau of Human Nutrition and Home Economics.

FOOD EXCHANGES—Lists of foods grouped in terms of approximate equivalents in carbohydrate, protein, and fat content; used for the purpose of planning diabetic, low-caloric, and other measured diets.

FORTIFIED FOOD—A food to which a vitamin or other dietary essential has been added in such an amount as to make the total content larger than that contained in any natural (unprocessed) food of its class—for example, vitamin D milk and fortified margarine.

- FORTIFIED MARGARINE**—Most of the margarine on the market in the United States is fortified with 15,000 I.U. of vitamin A per pound.
- GLYCOGEN**—A polysaccharide, also known as “animal starch,” which yields glucose on hydrolysis; found in liver, muscle, and other tissues.
- GOITER, SIMPLE**—Enlargement of the thyroid gland, caused by an absolute or relative deficiency of iodine.
- HEMICELLULOSE**—A group of polysaccharides forming part of the cell wall of plants; indigestible but may be broken down to a considerable extent by intestinal flora. It also absorbs water. *See* Fiber, crude.
- INORGANIC ELEMENTS**—*See* Ash; Minerals.
- INSULIN**—The hormone derived from the beta cells of the islands of Langerhans of the pancreas; essential for normal carbohydrate metabolism. Commercial preparations of insulin include regular, crystalline, protamine zinc, globin, NPH-50, and Lente.
- INTRINSIC FACTOR (CASTLE’S)**—A factor other than HCl, present in normal gastric juice in man but deficient in the gastric juice of the pernicious anemia patient.
- KETOSIS**—A condition in which there is an accumulation in the body of ketone compounds (beta-hydroxybutyric acid, acetoacetic acid, and acetone) as a result of incomplete oxidation of fatty acids; occurs when the amount of fat being oxidized is excessive, as with the use of ketogenic diets, in semi-starvation, and uncontrolled diabetes.
- LIGNIN**—A constituent of crude fiber, occurring in the cell wall of plants; resistant to hydrolysis by digestive enzymes, strong acids, and alkalies; not attacked to any extent by the intestinal flora. *See* Carbohydrate, indigestible; Fiber, crude.
- LIPIDS**—Fat or fatlike substances.
- MALNUTRITION**—A condition of the body resulting from an inadequate supply or impaired utilization of one or more of the essential food constituents.
- MALNUTRITION, CONDITIONED**—Deficiency of one or more nutrients in the tissues, caused by factors other than inadequate diet alone—for example, deficiencies caused by factors which interfere with ingestion, digestion, absorption, or utilization of essential nutrients or by factors that increase their requirement, destruction, or excretion.
- MENADIONE (C₁₁H₈O₂)**—A synthetic compound, having greater vitamin K activity than the naturally occurring vitamin; used as a reference standard for biological assays of vitamin K. Some water-soluble derivatives of menadione have been prepared.
- METABOLISM**—A general term to designate all chemical changes which occur to substances within the body after absorption. These changes include constructive (anabolic) and destructive (catabolic) processes.
- MICRONUTRIENTS**—Nutrients present in very small amounts in food; as applied to mineral elements, the term usually refers to those present in the body in amounts less than that of iron, as manganese, copper, iodine, cobalt, molybdenum, and zinc.
- MINERALS**—“Inorganic” elements. The following are known to be present in body tissue: calcium, cobalt, chlorine, copper, fluorine, iodine, iron, magnesium, manganese, molybdenum, phosphorus, potassium, sodium, sulfur, zinc. Mineral constituents, obtained from food, aid in the regulation of the

acid-base balance of body fluids and of osmotic pressure, in addition to the specific function of individual elements in the body. Some minerals are present in the body largely in organic combination, as iron in hemoglobin and iodine in thyroxine; others occur in the body in inorganic form, as calcium salts in bone, sodium and chlorine as sodium chloride. The terms "minerals" and "inorganic elements" do not imply that the element occurs in inorganic form in food or body tissue. *See Ash.*

NIACIN (C_5H_4NCOOH)—A water-soluble, heat-stable member of the vitamin B complex, also known as "nicotinic acid." The antipellagra factor. In nature it occurs chiefly as the acid amide; may be formed in the body from tryptophan.

NIACIN AMIDE ($C_5H_4NCONH_2$)—The amide of niacin, found in the body as a constituent of coenzymes I and II, which are essential for carbohydrate metabolism.

NIACIN EQUIVALENT—Recommended Dietary Allowances (1958) for niacin are expressed by the Food and Nutrition Board of the National Research Council as niacin equivalents on the assumption that 60 mg. tryptophan may be converted to 1 mg. niacin.

NICOTINAMIDE—*See* Niacin amide.

NUTRIENT—Any substance useful in nutrition—for example, proteins, fats, carbohydrates, minerals, vitamins, water. *See* Nutrition.

NUTRITION—The combination of processes by which the living organism receives and utilizes the materials necessary for the maintenance of its functions and for the growth and renewal of its components.

NUTRITION, NORMAL—A condition of the body resulting from the efficient utilization of sufficient amounts of the essential nutrients provided in the food intake.

NUTRITIONAL STATUS—The condition of the body resulting from the utilization of the essential nutrients available to the body. Nutritional status may be good, fair, or poor, depending not only on the intake of dietary essentials but on the relative need and the body's ability to utilize them. *See* Nutriture.

NUTRITIONIST—One who has a degree and advanced education or qualifying experience in public health nutrition.

NUTRITIONIST† (profess. & kin.) II—Applies science of nutrition to promotion of health and control of disease. Instructs auxiliary medical personnel and other allied professional workers on foods and science of nutrition. Advises public and private health agencies on nutrition phases of their programs, engaging in such activities as in-service training and clinic and community services. Participates in surveys concerning nutrition, gathering such information as food case histories.

NUTRITURE—Condition as to nourishment, either with respect to all nutrients (general nutriture) or to one nutrient at a time.

PELLAGRA—A disease caused by the lack of niacin equivalent, usually associated with deficiencies of other B vitamins. Signs and symptoms involve the skin, gastrointestinal tract, and nervous system.

PROTEIN—A nitrogenous compound which yields amino acids on hydrolysis; proteins are essential constituents of all living cells and the most abundant of the organic compounds in the body. Protein values as stated in food value tables are generally calculated from total nitrogen content and include, in

- addition to true protein, other nitrogenous compounds, such as amino acids and purine bases. *See* Acids, amino, essential.
- PROTEIN, BIOLOGICAL VALUE OF**—The percentage of absorbed nitrogen that is retained by the body. The numerical value obtained varies with the conditions of the experiment.
- PROTEIN, DIGESTIBILITY OF**—The percentage of consumed nitrogen that is absorbed. In general, values are higher for proteins of animal origin than for those of vegetable origin.
- PROTEIN, SUPPLEMENTARY EFFECT**—The ability of one protein to supply amino acids in which another protein is deficient, so that from the mixture of the proteins an adequate intake of amino acids is secured.
- PROTEIN HYDROLYSATE**—A mixture of amino acids and polypeptides prepared by the digestion of proteins by (1) acids, (2) alkalies, or (3) proteolytic enzymes. Properly prepared hydrolysates may be used for either oral or parenteral administration. Some methods of hydrolysis lead to the destruction of certain essential amino acids.
- PROVITAMIN**—The precursor of a vitamin. *See* Carotene; Ergosterol.
- PROXIMATE COMPOSITION**—As applied to food, the term usually includes the percentages of protein, fat, total carbohydrate, ash, and water; calorie values may also be included.
- PTEROYLGLUTAMIC ACID (PGA)**—One of the compounds of the folic acid group. *See* Folacin.
- PYRIDOXINE**—*See* Vitamin B₆.
- REFUSE**—That portion of foods as found on the retail market which is inedible (as bones, pits, and shells) or usually discarded in preparation of food for the table (as potato parings and tough outer leaves of vegetables). In food values expressed on the "as purchased" basis, nutrients in refuse are disregarded.
- REQUIREMENTS**—Although the average minimal requirements for various nutrients cannot be stated with accuracy, certain "minimum daily requirements" for food-labeling purposes have been designated in regulations for enforcement of the Federal Food, Drug and Cosmetic Act (*see Federal Register*, 6:5921-26, 1941, and 22:3841, 1957). These should not be confused with the Recommended Dietary Allowances.
- RESEARCH NUTRITIONIST†** (profess. & kin.)—Dietitian, research. Originates or assists in planning, organizing, and conducting programs in nutritional research. Performs essential research toward improvement of food as it relates to acceptability and physiological efficiency. Studies and analyzes recent scientific findings in nutrition for application in present nutritional research and in developing tools for planning future research.
- RESIDUE, FECAL**—The total solid of feces made up of undigested and unabsorbed food and metabolic and bacterial products. Some foods, such as milk, which contain no fiber may increase fecal residue.
- RIBOFLAVIN (C₁₇H₂₀N₄O₆)**—A member of the vitamin B complex; a water-soluble, heat-stable, yellow pigment having green fluorescence; essential as a constituent of several enzyme systems concerned with tissue respiration; destroyed by visible light, particularly blue and violet rays.
- RICKETS**—A disturbance in mineral metabolism occurring in infancy and childhood, in which calcification of the growing bone does not take place normally.

It occurs when the supplies of calcium, phosphorus, and vitamin D are not adequate to meet functional needs.

SALT, IODIZED—Table salt (sodium chloride) to which has been added 1 part per 10,000 of iodine as potassium iodide.

SATIETY VALUE—That quality of food contributing to satisfaction and resulting in a sustained sense of comfort or well-being.

SCURVY—A disease due to deficiency intake or faulty utilization of ascorbic acid. Infantile and adult scurvy differ in their clinical manifestations. *See* Acid, ascorbic.

SPRUE—A syndrome which usually responds to folic acid therapy but which has not been established as a dietary deficiency disease. Characterized by glossitis, diarrhea with increased fat in stools, impaired absorption of fat-soluble vitamins, flat oral glucose tolerance curve, and a macrocytic anemia associated with megaloblastic bone marrow.

THIAMINE ($C_{12}H_{17}N_4OS$)—Member of the B complex; the antiberiberi factor; a water-soluble, heat-labile vitamin; essential for growth and as a constituent of cocarboxylase; therefore functioning in carbohydrate metabolism.

TOCOPHEROL, ALPHA ($C_{29}H_{50}O_2$)—One of several tocopherols with vitamin E activity. Fat-soluble and heat-stable in the absence of oxygen; widely distributed in plant and animal tissues; may protect other fat-soluble vitamins from oxidative destruction in the intestinal tract. No clinical or physiologic correlates of low levels of serum tocopherol in humans have been reported, but the reversal of creatinuria following tocopherol administration to patients with absorptive defects and the finding of lesions similar to those of muscular dystrophy and of ceroid pigment in such patients suggests that vitamin E plays a role in human nutrition. In physically normal adults, an appreciable degree of erythrocyte hemolysis and depression of plasma tocopherol occurred only after 12–22 months of a diet containing 2 mg. *d*-alpha tocopherol daily. The daily adult per capital consumption of vitamin E in the United States has been estimated to be 14 mg.

TRACE ELEMENTS—Minerals occurring in small amounts in food or body tissues; those which are known to be dietary essentials are also called “micronutrients.” *See* Micronutrients.

UNIT, INTERNATIONAL VITAMIN (I.U.)—A definite quantity of each International Standard of Reference, used for expressing the content of the respective vitamins in foods and other materials. Such units have been established for vitamins A, C, D, and thiamine but are used principally for vitamins A and D, since values for thiamine and vitamin C can now be conveniently expressed in weights. Originally established by a committee appointed by the Health Organization of the League of Nations, standardization of vitamin units is now under the supervision of subcommittees of the World Health Organization.

UNIT, INTERNATIONAL VITAMIN A—The activity of 0.344 μ g. of vitamin A acetate; equal in biologic activity to 0.3 μ g. of vitamin A alcohol and of 0.6 μ g. of the provitamin β -carotene.

UNIT, INTERNATIONAL VITAMIN B₁—The vitamin B₁ activity of 3.0 μ g. of the International Standard crystalline thiamine hydrochloride (vitamin B₁), therefore 1 mg. thiamine equals 333 I.U.

UNIT, INTERNATIONAL VITAMIN C—The vitamin C activity of 0.05 mg. of the International Standard crystalline ascorbic acid (vitamin C).

UNIT, INTERNATIONAL VITAMIN D—The vitamin D activity of the International Standard solution of irradiated ergosterol in oil, containing 0.025 μ g. (0.000025 mg.) of calciferol.

UNIT, U.S.P. (United States Pharmacopoeia)—Equal to the corresponding International Units.

VIOSTEROL—A solution of irradiated ergosterol in oil in which the active agent is calciferol (vitamin D₂).

VITAMIN—An organic substance occurring in minute quantities in plant and animal tissues; must be either supplied in the diet of animals or synthesized from essential dietary or metabolic precursors; essential for specific metabolic functions or reactions to proceed normally.

VITAMIN A (C₂₀H₃₀OH)—A fat-soluble vitamin occurring in some foods of animal origin but formed in the animal body from plant precursors; essential for growth, regeneration of visual purple, and normal functioning of epithelial tissue. *See* Carotene.

VITAMIN A VALUE—The combined potency of a food or diet, represented by its content of vitamin A, carotene, and other plant precursors.

VITAMIN B₁—*See* Thiamine.

VITAMIN B₂, G—Obsolete; formerly used to designate fractions of vitamin B complex, especially riboflavin.

VITAMIN B₆—A group name applied to three closely related compounds: pyridoxine (C₈H₁₁O₃N) in plant products; pyridoxal (C₈H₉O₃N) and pyridoxamine (C₈H₁₂O₂N₂) in animal products. A water-soluble, heat-stable vitamin which is related to methionine and protein need. Choline, essential acids, biotin, and pantothenic acid decrease the requirement. The evidence available from animal experiments and tests on human volunteers indicates that the daily intake of vitamin B₆ should be from 1 to 2 mg., an amount readily provided by ordinary mixed diets.

VITAMIN B₁₂—A group name applied to several closely related red crystalline compounds containing cobalt, including cyanacobalamin (C₆₃H₉₀N₁₄O₁₄PCo), hydroxycobalamin, and others. Dietary deficiency has been observed in human beings who have lived on a strict vegetarian diet for several years. Lack of the intrinsic factor of Castle, as seen in spontaneously developing pernicious anemia or following gastrectomy, may be controlled by the parenteral administration of approximately 1 μ g. of the vitamin daily. Failure of absorption of the vitamin occurs in the absence of the intrinsic factor, although massive oral doses, i.e., 1 mg. or so, may be therapeutically effective. Bacterial or parasitic interference and a basic defect of the intestines, as found in non-tropical sprue, may also result in failure to absorb the vitamin. The ingestion of 1 cup of fluid cow's milk, 4 oz. of meat, and 1 egg per day would provide 2–4 μ g. vitamin B₁₂. The intake from food may be increased to 15–20 μ g. per day by the use of beef liver or kidney.

VITAMIN B COMPLEX—As originally used, this term referred to the water-soluble vitamins occurring in yeast, liver, meats, and whole-grain cereals, but some of the newer B complex vitamins, for example, folic acid and vitamin B₁₂, do not correspond to this distribution; includes a number of compounds which have been identified, isolated, and synthesized, viz., thiamine, riboflavin, nicotinic acid, vitamin B₆, pantothenic acid, biotin, folic acid, inositol, and choline; vitamin B₁₂, the structure of which has been determined; and others which have been only partially demonstrated or identified.

VITAMIN C—*See* Acid, ascorbic.

VITAMIN D—Designates any of several fat-soluble factors related to sterols, which are antirachitic, i.e., functioning in the regulation of calcium and phosphorus metabolism and growth. *See* Calciferol; Vitamin D₃.

VITAMIN D₂—*See* Calciferol.

VITAMIN D₃ (C₂₇H₄₄O)—A fat-soluble vitamin, obtained by the ultraviolet-ray activation of 7-dehydrocholesterol; occurs in fish-liver oils and in irradiated foods of animal origin; termed “natural” vitamin D.

VITAMIN D MILK—May be produced by three different methods: (1) “fortified” milk, which is now more generally distributed than the other types, is that to which a vitamin D concentrate has been added; (2) “metabolized” milk is produced by feeding the cows irradiated yeast; and (3) “irradiated” milk has been exposed directly to ultraviolet rays. The standard amount used for fortification is 400 I.U. vitamin D per quart of fresh or reconstituted milk.

VITAMIN E—*See* Tocopherol, alpha.

VITAMIN INHIBITORS—*See* Antivitamins.

VITAMIN K—A fat-soluble vitamin which is necessary for prothrombin formation. Vitamin K₁ (C₃₁H₄₆O₂), a yellow oil, is the form which has been isolated from green leaves; vitamin K₂ (C₄₁H₅₆O₂), a yellow crystalline compound, has been isolated from putrefied fish meal. These and other natural forms are fat-soluble and require bile salts for absorption, but several water-soluble forms have been synthesized. *See* Menadione.

VITAMINS, FAT-SOLUBLE—Vitamins A, D, E, and K, which are extractable from foods with fat solvents.

VITAMINS, WATER-SOLUBLE—Members of the B complex and vitamin C which can be extracted from foods with water as the solvent.

WATER, ENDOGENOUS—Water which is provided by metabolic processes.

WATER, EXOGENOUS—Water ingested as such or as a component of food. In food value tables, “water” includes volatile substances in addition to free water.

WATER, REQUIREMENT—Determined by body heat production, amounts of dissolved materials to be excreted by the kidney and its concentrating capacity, and losses due to sweating. Water and salt requirements are intimately related. Under ordinary environmental conditions, the daily requirement of a 70-kg. man on a 3,200-calorie diet is about 2,300–3,100 ml., much of which is contained in foods as eaten.

INDEX

INDEX

- Acetone, 103
- Acid ash residue, 105, 106, 216
values, excess acid, 202-4
- Acid(s)
aceto-acetic, 103
amino, essential; *see* Amino acids
arachidonic, 162-74, 216
ascorbic, 215; *see also* Ascorbic acid
benzoic, 106
beta-oxybutyric, 103
citric, 106
dehydroascorbic, 215
fatty essential, 216; *see also* Fatty acids
folic acid, 222
linoleic, 56, 57, 61, 162-74, 216
linolenic, 162-74
malic, 106
non-volatile, 38
oleic, 57, 61, 162-74
palmitic, 61
pantothenic, 215
para-aminobenzoic, 215
pteroylglutamic, 225
quinic, 106
stearic, 61
uric, 99-102
- Adolescence
normal diet, 26, 27
nutritional evaluation, 25
Recommended Dietary Allowances,
14
therapeutic diets
calorie-restricted, 46, 49-51
in diabetes, 86
sodium-restricted, 90, 91
weight for height, 14, 21, 206-9
- Alanine, 103
- Alcohol, 216
- Alcoholic beverages, 100, 159, 195-99
- Alkaline ash residue, 105, 106, 216
values, excess base, 202-4
- Allergen, 216
- Allergy, 216
recipes, 68
- Amino acids
content of foods, 66, 67, 175-92
essential, 64, 66, 67, 216
niacin equivalent, 13, 14, 18; *see also*
Niacin equivalent
requirements and allowances
infants and children, 64
young men, 64, 66, 68, 69
young women, 64, 66, 68, 69
restriction of phenylalanine, 64, 66, 67
- Anemia, 216, 217
extrinsic factor (Castle's), 222
intrinsic factor (Castle's), 223
- Anorexia, 217
- Antivitamin, 217
- A.P. (As Purchased), 217
- Arachidonic acid, 162-74, 216
- Arginine, 64, 66-69, 175-92
- Ascorbic acid
content of foods and diets, 7, 23, 25, 32,
35, 40, 101, 104, 124-26, 131-56
definition, 215
Recommended Dietary Allowances, 13,
14
"Average" diet in the U.S., 6, 55, 57
- Basic dietary plans; *see also under* various
diets
normal diet, 1-28
therapeutic, 29-120
- Beverages
alcoholic, 100, 159, 195-99, 216
bouillon, 32, 82, 100, 155, 194, 195
chocolate; *see* Chocolate
cocoa; *see* Cocoa
coffee, 38, 39, 100, 196
malted milk, 132
soft drinks, 155, 196-98
tea, 39
- Biotin, 217

Bouillon; *see* Beverages, bouillon

Bread

- composition, and in diets, 7, 9, 10, 23-27, 40, 42, 43, 49-51, 53, 57, 59, 65, 68, 77, 80, 83, 84, 86, 91, 93, 94, 100, 101, 124, 147-49, 170, 186, 193, 195, 202
- enriched, 147, 148, 222
- exchanges, 77, 80, 124
- mineral elements and excess of acidity and alkalinity, 202
- sodium content, 193, 195

British dietary standards, 15, 220

Butter, 57, 61, 82, 93, 100, 101, 106, 124, 153, 160, 162, 165, 171, 172, 193, 195, 202

Caffeine, 38, 39

Cake, 9, 10, 27, 43, 49, 50, 77, 80, 149, 164, 171

Calcium

- content of foods and diets, 7, 23, 25, 32, 35, 40, 65, 101, 104, 124, 125, 126, 131-56

Recommended Dietary Allowances, 13-14

Calculations, dietary, short methods, 3-6, 70-88, 121-29, 224; *see also* Diet, nutritional evaluations

Calories

- content of foods and diets, 7-9, 23, 25, 32, 33, 35, 40-42, 48, 49, 53, 57-59, 65, 67, 124-26, 131-56, 162-92

definition, 217, 221, 222

energy expenditure, 210-11

Recommended Dietary Allowances, 13-17, 20, 22

specific energy factors, 122, 123, 158, 221, 222

Canadian dietary standards, 15, 220

Candy, 126, 154, 165, 169, 193, 195

Carbohydrates

- cellulose, 36, 217, 219, 222
- content of foods and diets, 7, 23, 25, 32, 35, 40, 65, 70-80, 82, 86, 101, 104, 124-26, 131-56, 162-74

definitions, 217, 218

fiber content of foods, 19, 44, 71-73

hemicellulose, 36

indigestible, 36, 71-73, 217, 218

lignin, 36

measuring for diabetic diets, 72-74

total versus available, 71-73, 217, 218

Cardiac failure, congestive, 97

Carotene, 47, 87, 218, 227; *see also* Vitamins, A value

Cellulose, 36, 217, 219, 222

high-fiber diet, 218

low-fiber diet, 36-44, 218

Cereal products, composition, and in diets,

- 6, 7, 9, 10, 12, 23-27, 32-35, 40, 42, 43, 48-51, 53, 57, 59, 60, 65, 68, 77, 80, 91, 93, 94, 100, 101, 106, 124, 147, 150, 151, 158, 162, 169, 171, 186, 188, 193, 194, 196, 202-4

Cheese; *see* Dairy products

Chicken fat, 61

Childhood

normal diet, 21-24, 64

nutritional evaluation, 23

Recommended Dietary Allowances, 12-22

therapeutic diets

calorie-restricted (adolescence), 49

diabetic, 86

gladin-restricted ("gluten-free"), 68

sodium-restricted, 90, 91

weight for height, 14, 21, 206-9

Chlorine content of foods, 39, 89, 202-4

Chocolate, 39, 89, 100, 124, 126, 154, 155, 165, 169, 171, 185, 196, 202

Cholesterol

content of foods and diet, 57, 160-74

definition, 218

Cirrhosis, 97

Cocoa, 39, 89, 100, 169, 171, 193, 196, 202

Coconut oil, 61, 166, 172

Coeliac disease, 68, 69

Coffee, 38, 39, 100, 196

Connective tissue, 37

Cookies, 124, 149-50, 164, 196

Corn oil, 61, 165, 166, 172, 194

Cost of food, 115

Cottonseed oil, 61, 165, 166, 194

Cystine

content of foods, 175-92

requirements, 64, 66, 68, 69

Dairy products, composition, and in diets,

- 6-8, 10, 23-27, 32-34, 36, 40, 41, 43, 48-51, 53, 57, 58, 61, 65, 71, 72, 81, 83, 86, 91, 92, 94, 96, 100, 101, 104, 124, 131-33, 153, 160, 163, 165, 170, 171, 176, 193-97, 202, 203

Desserts, 9, 10, 24, 26, 27, 43, 47, 49, 50, 59, 80, 95, 96, 124, 126, 149, 151-52, 163-65, 170, 171, 194

Diabetic diet; *see* Diet, diabetic

Diet, acidic and basic elements, 105, 106, 216

values, excess acid or base, 202-4

Diet, "average" in the U.S., 6, 55, 57

- Diet, bland, 218, 219; *see also* Diet, low-fiber; Diet, soft
- Diet, calorie-restricted
 basic dietary plan, 7-9, 48, 49
 caloric allowance, 45, 46
 definition, 45
 desserts, 47
 maintenance diet for desirable weight, 47
 menu pattern and sample meals
 for adolescence, 51
 for adult, 50
 for pregnancy, 51
 mineral oil, 47
 modifications, 49
 nutrient content, 46
 preparation of food, 46, 47
- Diet, diabetic, 70-88
 calculations, 83, 84
 caloric allowance, 86
 composition of foods, 70
 food exchange lists, 71-82
 bread, 80
 fats, 82
 fruits, 79
 meat, 81
 milk, 72
 vegetables, 76, 80
 nutritional evaluation, 87
 sample meal plans, 85, 86
 "specialty" foods, 83
- Diet, fat modifications
 animal fats, 61, 170-74
 "average" fat consumption, 6, 55, 57
 basic dietary pattern, 30 gm. fat, 56-60
 cholesterol content of diet, 57
 fatty acid content of diet, 57
 menu pattern and sample meals, 60
 preparation of food, 56, 59, 60, 61
 cardiovascular disease, 56
 cholesterol content of foods, 57, 160-74
 cookbooks, 61
 definition, 218
 fat content of foods and diets, 32, 33, 35, 40, 42, 49-51, 57, 61, 65, 82-84, 86, 101, 103, 104, 124-26, 131-56, 162-74
 fatty acid content of foods, 56, 57, 61, 131-56, 162-74; *see also* Arachidonic acid; Linoleic acid; Linolenic acid; Oleic acid; Palmitic acid; Saturated fats; Stearic acid; Unsaturated fats
 vegetable fats, 61, 170-74, 194
- Diet, gliadin-restricted, 68
- Diet, "gluten-free"; *see* Diet, gliadin-restricted
- Diet, high-calorie
 caloric allowance, 52
 definition, 52
 food distribution, 53
 home food intake, 52
 plan of diet, 54
 supplements, 500-calorie, 53
- Diet, high-protein; *see* Diet, protein, modifications
- Diet, interviewing, 109-19
- Diet, ketogenic
 antiketogenesis, 103
 basic dietary plan, 103, 104
 definition, 103
 ketogenesis, 103
 nutritional evaluation, 104
 preparation, 105
- Diet, liquid
 basic dietary plan, 32
 clear liquid, 31
 definition, 31
 full liquid, 31
 menu pattern, 34
 nutritional evaluation, 31-33
 tube feedings, 34, 35
- Diet, low-calorie; *see* Diet, calorie-restricted
- Diet, low-cholesterol; *see* Diet, fat modifications
 cholesterol content of diet and foods, 57, 160-74
- Diet, low-fat; *see* Diet, fat modifications
- Diet, low-fiber; *see also* Diet, soft
 basic dietary plan, 40, 41
 definition, 218
 fiber content of foods, 36, 44, 73
 nutritional evaluation, 40, 41
 restrictions, 41
 sample menu pattern and sample meals, 43
- Diet, low-gliadin ("gluten-free"); *see* Diet, gliadin-restricted
- Diet, low-purine, 99-102
- Diet, normal, 3-28
 aim, 3
 basic dietary plan, 8, 9
 modifications
 adolescence, 25, 26
 after age sixty-five, 27, 28
 childhood, 21-24
 infancy, 14, 18, 22
 lactation, 20, 21
 pregnancy, 20, 21, 23
 nutritional evaluation, 7, 23, 25

Diet, normal—*Continued*

- Recommended Dietary Allowances, 12-28
- sample menu plans and sample meals, 10, 24, 26, 27
- Diet, phenylalanine-restricted, 64-67
- Diet, potassium modifications; *see* Potassium, content of foods
- Diet, protein, modifications
 - allergy recipes, 68
 - amino acids
 - essential, 64, 66, 67, 216
 - food content, 66, 67, 175-92
 - requirements
 - infants and children, 64
 - men and women, 64, 66
 - basic dietary pattern, 125 gm. protein, 63-65
 - nutritional evaluation, 65
 - biologic value, 63, 225
 - content of foods and diets, 7, 8, 10, 23-25, 40, 57, 65, 67, 71, 81, 83, 86, 91, 101, 104, 124-26, 131-56, 162-92
 - definitions, 219, 225
 - digestibility, 63, 225
 - gliadin restriction ("gluten-free"), 68, 219
 - high-protein diet, 125 gm., 63-65
 - drink, 64
 - hydrolysate, 66, 215
 - kwashiorkor, 64
 - niacin equivalent, 7, 18, 23, 25, 32, 35, 40, 65, 66, 101, 104, 224
 - phenylalanine restriction, 64-67
 - phenylketonuria, 67
 - protein fractions, 68
 - Recommended Dietary Allowances, 12-28
 - supplementary effects, 225
- Diet, sodium-restricted
 - adolescence, 90, 91
 - basic dietary patterns, 7, 91-93
 - definition, 89, 219
 - foods to avoid, 92, 93
 - labeling, 96
 - nutritional evaluation, 90-93
 - pregnancy, 90, 91
 - preparation, 90, 95, 96
 - sample menu pattern and sample meals, 94
 - sodium content of foods, 91-93, 96, 193-99, 202-4
 - content of waters, 200-201
 - substitutes

- contraindications, 97

- for salt, 93

- supplementary materials, 96-97

Diet, soft; *see also* Diet, low-fiber

- basic dietary pattern, 40-42

- definitions, 36, 203

- fiber, 36, 44, 73

- flavor, 37

- "gas-forming" vegetables, 37, 38

- nutritional evaluation, 40, 41, 42

- protein content of diet, 40, 41

- restrictions, 38, 39, 41

- sample menu pattern and sample meals, 43

- spices, 38

Dietary allowances and standards

- British Medical Association, 15, 220

- Canadian Council on Nutrition, 15, 220

- Federal Food, Drug, and Cosmetic Act, 225

- Food and Nutrition Board, National Research Council, 12-28

- Dietary calculations, shortened methods, 3-6, 70-88, 121-29; *see also under* various diets, nutritional evaluations

- Dietary consultant, 220

- Dietetic intern, 220

- Dietetic interview, 109, 119

- Dietitian, 220

- administrative, 221

- research, 225

- teaching, 221

- therapeutic, 221

- Digestibility, coefficient of, 221

- Eggs, composition, and in diets, 6-8, 10, 23-27, 31-35, 40, 41, 43, 44, 48, 50, 51, 53, 57, 58, 81, 91, 92, 94, 99, 100, 101, 104, 124, 132, 160, 163, 174, 177, 194, 196, 203

- Energy, food; *see* Calories

Energy expenditure

- age, 17

- body weight, 17

- climate, 16, 17

- non-occupational activities, 210, 211

- "reference" man, 15, 16

- "reference" woman, 15, 16

- rest in bed, 210, 211

- sitting, 210, 211

- walking, 210, 211

- working activities, 210

- E.P. (edible portion), 221

- Ergosterol, 222

- Exchanges, foods, 5, 70-88, 222

- Extrinsic factor (Castle's), 222

- Fat, low, diet; *see* Diet, fat modifications
- Fat, nutritional role, 56
- Fat consumption, 6, 22, 55, 56
- Fat content of foods; *see* Diet, fat modifications
- Fat exchanges, 82
- Fat metabolism, 56
- Fatty acid content of foods, 56, 57, 61, 131-56, 162-74
- Fatty acids
 - essential, 216
 - saturated, 57, 61, 162-74
 - unsaturated, 57, 61, 162-74
- Fiber, crude, 224; *see also* Diet, low-fiber
- Fish, composition, and in diets, 6-8, 10, 23-27, 40, 41, 43, 46, 48, 50, 51, 57, 58, 65, 81, 91, 92, 94, 99, 104, 106, 125, 135-36, 158, 160, 161, 166, 172, 180, 194, 196, 203
- Flour, enriched, 80, 147, 148, 158, 186, 187, 188, 194, 196, 197, 203, 222
- Folacin, 222
- Folic acid, content of foods, 222
- Food composition
 - acidity and alkalinity, 105, 106, 202-4, 216
 - alcoholic beverages, 159
 - amino acids, 64, 66, 67, 175-92, 216
 - basic diets, normal, 1-28; *see also* Diet, normal
 - therapeutic, 29-120; *see also under* various diets
 - calories; *see* Calories
 - carbohydrates; *see* Carbohydrates
 - cholesterol, 57, 160-74, 218
 - energy factors, specific, 122, 123, 158
 - fat; *see* Diet, fat modifications
 - fatty acids, 56, 57, 61, 162-74, 216
 - food exchanges, 70-88
 - food values in common portions, 131-56
 - minerals; *see* Calcium; Chlorine; Iron; Magnesium; Phosphorus; Potassium; Sodium; Sulphur
 - protein; *see* Diet, protein, modifications
 - purine, 99-102
 - short method of dietary calculations, 3-6, 70-88, 121-29, 222; *see also under* various diets, nutritional evaluation
 - vitamins; *see* Vitamins
- Food consumption, 6, 22, 55, 56, 122
- Food distribution, 53, 54, 85
- Food exchanges, 6, 70-88, 222
- Food groups, 2-6, 70-88, 121-29; *see also under* various diets, nutritional evaluation
- Food and Nutrition Board, National Research Council, 12-28, 56, 61, 97, 193, 194
- Fortified food, 222
- Fortified margarine, 223
- Fruits, composition, and in diets, 6-8, 10, 23-27, 32, 33-35, 40, 41, 43, 48, 50, 51, 53, 57, 59, 60, 65, 67, 77, 78, 86, 90-94, 100, 101, 104-6, 125, 141-47, 158, 164, 166, 168, 172, 174, 188, 189, 193-99, 202-4
- Gliadin restriction, 68
 - glutamine-bound fraction, 68
 - "gluten-free" diet, 68
 - recipes, 68
 - wheat-rye-oat-free diet, 68
- Glossary of Dietetic Terms, Revised, 1958
 - dietetic terms, 213-28
 - history, 213-14
- Gluten flour, 197, 199
- "Gluten-free" diet; *see* Diet, gliadin-restricted
- Glycine, 103
- Goiter, simple, 223
- Gum, 197
- Hemicellulose, 36, 73, 223
- Histidine
 - content of foods, 103, 175-92
 - requirements, 64, 66-69
- Infants, 14, 18, 22
- Insulin, 85, 223
- Interviewing the patient, 109-19; *see* Dietetic interview
- Intrinsic factor (Castle's), 223
- Iodized salt, 9, 49, 93, 226
- Ion-exchange milk, 92, 96
- Iron
 - content of foods, 7, 23, 25, 32, 35, 40, 65, 101, 104, 124-26, 131-56
 - Recommended Dietary Allowances, 13, 14
- Isoleucine
 - content of foods, 175-92
 - requirements, 64, 66, 68, 69
- Ketosis, 103, 223
- Kwashiorkor, 64
- Lard, 61, 149
- Legumes, composition, and in diets, 8-10, 24, 26, 27, 41, 43, 48, 49, 50, 51, 61, 68, 77, 80, 89, 100, 125, 137-39, 158, 163, 165, 166, 172, 182, 183, 184, 193, 195, 198, 202, 204

Leucine

- content of foods, 103, 175-92
- requirements, 64, 66, 68, 69

Lignin, 36, 73, 223

Linoleic acid, 56, 57, 61, 162-74

Linolenic acid, 162-74

Liquid diet

- clear, 31, 219
- full, 31-35, 219

Lysine

- content of foods, 175-92
- requirements, 64, 66, 68, 69

Magnesium, content of foods, 202-4

Margarine, fortified, 165, 171, 223

Meat, composition, and in diets, 6-8, 10, 23-27, 40, 41, 43, 46, 48, 50, 51, 57, 58, 65, 81, 90, 92, 94, 99, 104, 106, 125, 133-35, 158, 160, 161, 167, 171, 173, 177-79, 181, 182, 193, 194, 195, 197-99, 202-4

Meat, raw, yield per pound cooked, 157

Menadione, 223

Ménière's disease, 97

Methionine

- content of foods, 175-92
- requirements, 64, 66, 68, 69

Milk, low-sodium (ion-exchange), 92, 96
vitamin D, 228; *see also* Dairy products

Molasses, 155

Niacin, 124-26, 131-56, 224

Niacin amide, 224

Niacin equivalent

- content of diets, 7, 23, 25, 32, 35, 40, 65, 101, 104

definition, 224

- Recommended Dietary Allowances, 13-14, 18

Nutritionist, 224

- research, 225

Nuts, 81, 82, 126, 136-37, 158, 168, 174, 184, 185, 193, 194-99, 202-4

Oleic acid, 6, 56, 57, 61, 162-74

Olive oil, 61, 172, 197

Palmitic acid, 61

Pantothenic acid, 215

- content of foods, 215

Peanut oil, 61, 172

Pellagra, 224

Phenylalanine

- content of foods, 66, 67, 103, 175-92
- dietary restriction, 64, 66, 67
- requirements, 64, 66, 68, 69

Phenylketonuria, diet in, 64, 66, 67, 69

Phosphorus, content of foods, 124-26

Physical activity, requirements, 15, 16, 22, 45, 46, 210, 211

Physiologic fuel values, 5, 73, 122, 123, 158

Pie, 9, 10, 27, 43, 49, 50, 77, 80, 124, 151-52, 158, 164, 165, 171

Potassium, content of foods, 195-99, 202-4

Poultry, 6-8, 10, 23-27, 40, 41, 43, 46, 48, 50, 51, 57, 58, 65, 81, 90, 92, 99, 104, 106, 125, 133-34, 161, 167, 173, 179, 181, 193, 199, 202, 204

Pregnancy

- normal diet, basic dietary plan, 8-10
- nutritional evaluation, 25

Recommended Dietary Allowances, 12-28

- sample menu pattern and sample meals, 26

therapeutic diet

- calorie restriction, 49
- sodium restriction, 91

toxemia, 97

Protein; *see* Diet, protein, modifications

Pteroylglutamic acid, 225

Purine, low, diet, 99-100

- content of foods, 100

Pyridoxal, 227

Pyridoxamine, 227

Pyridoxine, 227

Recommended Dietary Allowances, 12-28

- adjusted for climate, 16

- adjustment for age, 13, 14, 17

- British standards, 15, 220

- caloric allowances for various body weights and ages, 17

- Canadian standards, 15, 220

- desirable weight for height, 16, 205-9

- purposes and intended uses, 12-15

- "reference" man and woman, 15, 16

- scientific bases, 15-19

Referral, dietetic, 115-17

Refuse, food, 225

Renal disease, 97

Requirements, nutritional, "average minimal"; *see also* Dietary allowances and standards

- Federal Food, Drug, and Cosmetic Act, 225

Riboflavin

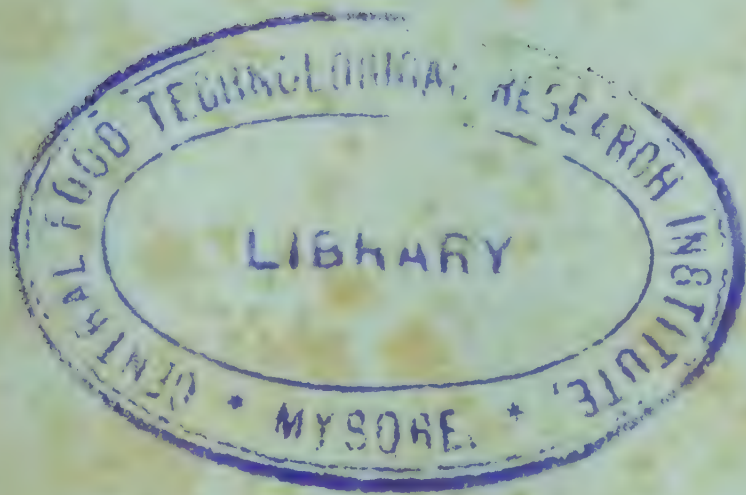
- content of foods and diets, 7, 23, 25, 32, 35, 40, 101, 104, 124-26, 131-56

- definition, 225, 226

- Recommended Dietary Allowances, 13, 14

Rickets, 226

- Safflower oil, 165, 172
- Salt, iodized, 49, 93, 226
substitutes, 93, 97; *see also* Diet, sodium-restricted
- Saturated fats, 56, 57, 61, 162-74
- Sesame oil, 165
- Short methods of dietary calculation, 3-6, 70-88, 121-29; *see also* Basic dietary patterns; *and under* various diets, nutritional evaluation
- Sodium
content of foods, 91-103, 96, 193-99, 202-4
of waters, 200, 201
diet; *see* Diet, sodium-restricted
- Soft diet; *see* Diet, soft
- Soups, 156, 195, 199
- Soybean oil, 61, 165, 172
- Soybeans, 163, 166, 169, 184, 194, 199, 204
- Spices, 38, 41, 195-99
- Sprue, 68, 69, 226
- Stearic acid, 61
- Sulphur, content of foods, 202-4
- Sunflower oil, 165
- Supplements, 500-calorie, 53
- Tannin, 39
- Tea, 39
- Teaseed oil, 165
- Test diets, 219
- Theobromine, 39
- Thiamine
content of foods and diets, 7, 23, 25, 32, 35, 40, 65, 101, 104, 124-26, 131-56
definition, 226
Recommended Dietary Allowances, 13, 14
- Threonine
content of foods, 175-92
requirements, 64, 66, 68, 69
- Tobacco, 199
- Tocopherol, 226
- Tryptophan
content of foods, 175-92
requirements (niacin-tryptophan equivalent), 13, 14, 66
- Tube feedings, 34, 35
- Tyrosine
content of foods, 103, 175-92
requirements, 64, 66, 68, 69
- Ulcer management, reduction of gastric acidity, 38, 39
- Unit
international vitamin, 226
vitamin A, 226
vitamin B₁, 227
vitamin C, 227
vitamin D, 227
U.S.P., 227
- Unsaturated fats, 56, 57, 61, 162-74
- Valine
content of foods, 175-92
requirements, 64, 66, 68, 69
- Vegetable oils, 61, 165, 166, 172, 193, 194
- Vegetables, composition, and in diets, 6-8, 10, 23-27, 32-35, 40, 41, 43, 48, 50, 51, 53, 57-59, 60, 65, 72-80, 86, 89, 91-95, 100, 101, 104, 105, 126, 137-41, 158, 169, 182-84, 189-99, 202-4
- Viosterol, 227
- Vitamins
A, 227; *see also* Carotene
A value, 227
content of foods and diets, 7, 23, 25, 32, 35, 40, 65, 101, 104, 124-26, 131-56
definition, 218, 227
B complex, 227-28; *see also* Acid(s), para-aminobenzoic; Biotin; Folicin; Niacin equivalent; Pteroylglutamic acid; Pyridoxal; Pyridoxamine; Pyridoxine; Riboflavin; Thiamine; Vitamins, B₁₂
B₆, 227; *see also* Pyridoxal; Pyridoxamine; Pyridoxine
B₁₂, 227
C; *see* Acid, ascorbic
D, 13, 14, 21, 23, 25, 228
K, 228; *see also* Menadione
Recommended Dietary Allowances, 13, 14
- Water
endogenous, 228
exogenous, 228
requirement, 228
sodium and potassium content, 200, 201
- Weights and heights
adolescence, 14, 21, 206-9
adults, 13, 16, 17, 205
after age sixty-five, 13
childhood, 14, 21, 206-9
infants, 14, 206-9
- Wheat germ, 153, 174, 199
- Yeast, 156, 160, 199
- Yogurt, 132, 170



C. F. T. R. I. LIBRARY, MYSORE.

Acc No. 4966

Call No. L:573 J9
L; 21:642'8 N59

Please return this publication on or before the last DUE DATE stamped below to avoid incurring overdue charges.

Due Date	Return Date	Due Date	Return Date
6.8.70	22.7.70	30.12.80	19.12.80
20.1.71	18.1.71	22/41	18.12.89
14.3.71	28/2/71	30/10/97	
24.7.71	21.7.71		
Ref. 377			
30.12.71.	20/12		
1 JUL 1972	28 JUN 1972		
6.10.72	21 SEP 1972		
3 NOV 1972	19 OCT 1972		
18.3.74	13/3		

CFTRI-MYSORE



4966

Handbook of diet.

